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Price and Income Elasticity of the Demand for Health Insurance and Health Care Services: A Critical Review of the Literature

Final Report

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EXECUTIVE SUMMARY

Resolving the national debate on the affordability of health care is likely to turn, at least in part, on the question of how consumer demand for health insurance and health care services responds to changes in price or income. Estimates of responsiveness—measured as price and income elasticities—are often used to develop and analyze proposals to expand access to health insurance or constrain the growth in health care expenditures.

The price and income elasticities measured in the RAND Health Insurance Experiment (HIE) of the 1970s remain a widely used source of elasticity estimates with respect to the demand for covered health care services. However, these estimates may fail to support today's analyses of health care utilization. Indeed, more recent anecdotal evidence and estimates suggest that the demand for some major components of health care—for example, prescription drugs and mental health services—may have changed significantly in the past 30 years. Furthermore, the HIE did not envision the emergence of important health insurance plan designs and strategies that are common today, such as differences in cost sharing for different medical services in health insurance plans (e.g., reduced cost sharing for preventive care or tiered formularies for prescription drugs) and the use of managed care techniques.

In addition, there is no single reference point for elasticity estimates with respect to the demand for health insurance like the ones measured in the HIE for health care services. The range of elasticity estimates in the research literature appears to support the notion that there would be wide variation the estimated response to public policy proposals that would reduce the price of insurance to encourage greater coverage.

This report reviews more than 80 recent studies that produced estimates of the elasticity of demand for health insurance and health care services. It identifies gaps in the available estimates, and also in the science of estimating demand elasticities. All these studies are more recent than the HIE, and most were conducted since 1990.

ELASTICITY OF DEMAND FOR HEALTH INSURANCE

The research literature indicates that the demand for health insurance is, in general, price-inelastic. That is, a percentage change in the price of insurance—to employers, employees, or individuals in the nongroup market—evokes a smaller percentage change in demand. However, the range of estimated elasticities is wide. Specifically:

- Estimates of the price elasticity of employer offer range from –0.14 to –5.8, but they hover around –0.6. Small firms are less likely to offer insurance, and their price elasticity of demand is greater than that of larger firms.
- Among workers who are offered insurance by their employer, the price elasticity of take up is relatively low. Most estimates fall below –0.1.

- Depending on how many alternative insurance options presented to an employee, the price elasticity of demand among insured workers for any one option may be relatively large, but its absolute value is still less than one.
- In the individual market, estimates of the price elasticity of demand are usually in the range of –0.2 to –0.6.
- Evidence on the price elasticity of demand among Medicare beneficiaries for Medicare+Choice (now Medicare Advantage) plans is scarce, but suggests that elderly beneficiaries are less sensitive than nonelderly consumers to the price of insurance.
- Limited evidence implies that lower-income consumers are more price sensitive than higher-income consumers, all else being equal.
- There is no evidence suggesting that employers as a whole are less likely to offer coverage when a greater proportion of their employees or dependents are eligible for Medicaid—although small low-wage employers may be less likely to do so.

The few observational studies that can be used to estimate the income elasticity of demand consistently indicate that the demand for health insurance is inelastic with respect to differences in consumer income. These studies typically peg the income elasticity of demand for health insurance at less than 0.1.

ELASTICITY OF DEMAND FOR HEALTH CARE SERVICES

Consistent with the HIE, more recent research has estimated the demand for insured health services to be inelastic with respect to price. Most estimates of the price elasticity of demand for health care services in general (or total spending) are about –0.2. Estimated price elasticities differ by type of service, but the differences are not generally large. Specifically:

- Insured consumers may cut back on their overall health spending by 2 percent in response to a 10 percent increase in the price of health care (net of insurance coverage). Price-induced changes in demand have been attributed more to changes in the probability of using any care than to changes in the amount of care used once it is accessed.
- Low-income consumers are more sensitive to changes in the price of care. Consequently, they may be more likely to experience adverse consequences from higher cost-sharing.

With respect to different types of health care services, both the HIE and more recent studies have found that there are service-specific differences in the price elasticity of demand. For example:

- Estimates of the price elasticity of demand for prescription drugs are usually in the range of –0.1 to –0.6. The introduction of multi-tier formularies reduces drug expenditures, and the demand for some drugs (e.g., those treating symptomatic conditions) may be more price elastic than the demand for other drugs. However, direct-to-consumer advertising may significantly reduce the price elasticity of demand for at least some prescription drugs.

- The demand for inpatient services may be less price sensitive than the demand for outpatient services. However, the evidence suggests that inpatient and outpatient care are complementary to, not substitutes for, one another. That is, greater use of inpatient care is consistent with greater use of outpatient care.

- The limited evidence on price elasticity of demand for mental health care, dental services, and long-term care services suggests the demand for these services among insured consumers may be more price elastic than the demand for other types of care.

Estimates of the income elasticity of demand for health care services based on observational studies consistently range from 0.0 to 0.2, suggesting that consumers do not use more health care as their income rises. However, some studies that have estimated income elasticity by using time-series or aggregated state- or country-level data have produced higher estimates of income elasticity—in the range of 0.2 to 1.5.

METHODOLOGICAL CHALLENGES

At least four methodological challenges are common in estimating the elasticity of demand for health insurance or health care services:

- Price cannot be observed among consumers who do not purchase insurance or do not use health care services, and may be systematically higher for such consumers.

- It is difficult to avoid an endogenous price variable. That is, price may reflect factors that are correlated with demand, and it is difficult to specify a model that adequately controls for these factors in estimating the elasticity of demand.

- The inability to observe some determinants of demand results in underspecified models and probably biased estimates of demand.

- Models of demand typically do not account for provider-induced or other supply-side behavior changes that may alter demand.

GAPS IN THE LITERATURE

A number of gaps in the literature with respect to estimating or applying elasticity estimates make it difficult to anticipate the effects of public policy proposals to either expand coverage or improve the efficient use of health care services. Specifically:

- ***Data limitations.*** Data measuring the options available to consumers or their behavior over time—and with sufficient observations to obtain statistically significant results—are rare. As a result, available elasticity estimates often reflect omitted variable bias or endogeneity bias.

- ***Methodological limitations.*** Many statistical models have been used to address methodological challenges due to limited data. However, the field would benefit from improvements in techniques for linking multiple sources of data to estimate consumer response in complex markets and over time.

- ***Limited knowledge about the demand for certain insurance products, such as high-deductible health plans and health savings or reimbursement accounts.*** While high-deductible insurance products have captured the attention of policymakers as a promising model for reducing cost and expanding coverage, there are few analyses of the potential demand for these products by the general public or the change in their use of care once enrolled.

- ***Limited knowledge about demand among critical subpopulations, such as Medicare beneficiaries, low-income populations, and individuals or families with income just above the level that typically would qualify them for public assistance.*** Demand elasticities estimated for the general population are likely to produce flawed estimates of the impacts of policy changes that target particular subpopulations.

- ***Limited knowledge about the elasticity of demand for specific services—especially mental health care and long-term care.*** These services represent a substantial share of the cost of state Medicaid programs, in particular—while private insurance historically has restricted coverage for mental health care and long-term care relative to other service types. Consumer responses to improved coverage for these and other types of care—such as preventive services or specific types of prescription drugs—merit further research to support improvements in the design of public and private coverage.

- ***Absence of protocols for applying elasticity estimates in policy simulations.*** Inappropriate use of estimated elasticities (including indiscriminate use without reference to the formulas that calculated them) can introduce substantial error in the analysis of policy options. In addition, failure to conduct sensitivity analyses can suggest more certainty about effects than is warranted by the variance around estimates of demand elasticity. A clearer and common understanding of how specific elasticity estimates are formulated and how analysts should handle error in the estimates could help to reduce the range of disagreement around public policy options.

Bridging any or all of these gaps would contribute significantly to improving the science of elasticity estimation and the resources available to understand the potential impacts of major changes in health care policy.

I. INTRODUCTION

Despite changes in health care products and public policy intended to reduce cost and encourage coverage, the cost of health care and health insurance continues to grow, as does the number of uninsured. In 2004, the United States spent $6,280 per capita on health care—approximately 50 percent more than any other country in the world—largely related to higher prices for medical care (Smith et al. 2006; Anderson et al. 2005). At the same time, the percent of the nonelderly population without health insurance coverage reached nearly 18 percent (Fronstin 2005).

Facing these dual problems, both public policymakers and leaders in the private sector are keenly interested in using price incentives to increase the purchase of insurance coverage and to constrain unnecessary or inappropriate use of care. For example, various proposals would use tax incentives to encourage employer offer of coverage, employee take up, or the purchase of individual health insurance. Some private insurers have introduced high-deductible health plans in an effort to make available lower-priced insurance options. Public programs such as Medicare and State Children's Health Insurance Program (SCHIP) increasingly use cost sharing in an effort to reduce the use of care that is of less value to consumers.

While improving access to adequate and appropriate health care remains among the top priorities of health policy makers, the information available to support development and analysis of policy proposals lags far behind. In particular, some of the most critical information—measures of consumer responsiveness to health service prices—dates from the Health Insurance Experiment (HIE) conducted by the RAND Corporation in the 1970s. More recent estimates suggest the demand for some major components of health care spending—such as prescription drugs and mental health care—may have changed significantly in the last 30 years. Furthermore,

the HIE did not envision the emergence of many important influences on health care costs and coverage—such as varied cost sharing for different medical services in health insurance plans (e.g., lower cost sharing for preventive care and tiered formularies for prescription drugs), the use of managed care techniques, and many other aspects of benefit design and management that are common today.

In addition, there is no single reference point of elasticity estimates (like the ones measured in the HIE) with respect to the demand for health insurance, either by employers, employees, or individuals in the nongroup market. The range of elasticity estimates in the research literature appears to support the notion that there is wide variation the estimated response to public policy proposals that would alter the price of insurance to encourage greater coverage.

The Office of the Assistant Secretary for Planning and Evaluation (ASPE) is concerned whether the HIE estimates or subsequent estimates of price and income elasticity accurately reflect today's health insurance and health care markets, and therefore are adequate to support the development of public policy. A critical review of the research literature on consumer responsiveness to the price of health insurance and services is an essential first step in appraising this concern.

This report reviews estimates of the price and income elasticities of demand for health insurance and health care services in the research literature. The number of studies that have estimated the elasticity of demand for health insurance and services products is very large. In order to produce a manageable review, we restricted the studies included in this report using three criteria:

- The study produced estimates of the price or income elasticity of demand for health insurance and/or the demand for health care services, or it generated other estimates that are useful in understanding the responsiveness of demand to changes in price or income.

- The study was empirical and based on micro-level data, or it reflects a methodological improvement.
- The study was published after 1990, it is considered seminal (e.g., the HIE), or it represents the only instance of an estimate for a particular population or type of service.

Our search started with recent articles included in compendiums by Cutler (2002a), Ringel et al. (2002) and Morrisey (2005). We reviewed the reference lists from identified articles and also searched various online listings, research reviews, and electronic databases such as EBSCOhost, ISI Web of Knowledge, and NEXIS. From these resources and through consulting researchers involved in this subject, we identified more than 100 published and unpublished studies (see appendix A for a bibliography), among which more than 80 studies met the above criteria and are reviewed in this report (Table I.A).

TABLE I.A

NUMBER OF STUDIES REVIEWED, BY TOPIC

Health Insurance		Health Care Services	
Topic	Number of Studies	Topic	Number of Studies
Price Elasticity		**Price Elasticity**	
Employer offer	8	Overall health services	7
Employee take-up	10	Prescription Drugs	13
Employee choice of plan	11	Acute care	
Nongroup market	6	Inpatient and outpatient	3
Public programs		Emergency department	1
Medicare + Choice	4	Mental health	5
Medicaid and SCHIP	1	Dental	1
Military CHAMPUS	1	Long-term care	2
Crowd-out of private coverage	4		
Income Elasticity	5	**Income Elasticity**	4
Total	**50**	**Total**	**36**

Note: Studies may be double counted if they cover more than one topic.

The following chapters offer background information, reviews of specific studies, and discussion of overarching issues. Chapter II offers a definition on alternative measures of

demand elasticity and describes factors that may contribute to variation in elasticity estimates. Chapters III through V present syntheses of the research literature estimating, respectively, the price elasticity of demand for health insurance, the price elasticity of demand for covered health care services, and the income elasticity of demand for health insurance and services. To the extent possible, each chapter addresses different products separately. With respect to each type of elasticity, we describe the range of estimates, compare estimates for specific subpopulations, and identify common methodological challenges in estimating elasticity.

Chapter VI reviews applications of elasticity estimates and summarizes the policy implications that researchers have drawn. The main methodological challenges identified earlier are summarized in Chapter VII, as well as approaches that researchers have used to address some of these challenges. Finally, Chapter VIII identifies remaining gaps in the literature. This chapter draws from the literature review as well as early discussions with some users of elasticity estimates who were involved in another part of this project, assessing stakeholder needs.

II. DEFINITION AND VARIATION OF ELASTICITY MEASURES

The elasticity of demand is a measure of consumer response to a change in the price of a product, the price of related products, or personal income. In this chapter we describe three alternative measures of price and income elasticity with respect to demand for health insurance and health services products. In addition, we describe factors that may contribute to different magnitudes of elasticities estimated for the same types of products and consumers.

A. ALTERNATIVE MEASURES OF DEMAND ELASTICITY

Several measures of elasticity are important to public policy development and analysis, and have been estimated (with more or less frequency) in the research literature. Each is described below.

1. Own-Price Elasticity

The own-price elasticity of demand is a measure of the responsiveness of demand to a change in the product's own price. In general, the own-price elasticity of demand is negative—that is, a higher price or greater cost sharing reduces the quantity of health insurance or medical services demanded, all else being equal. The demand for health care is generally estimated to be price-inelastic (the absolute value is less than one), meaning that consumers do not strongly reduce the amount of care they use in response to an increase in price. Still, the magnitude of own-price elasticity estimated in the literature varies.

2. Cross-Price Elasticity

In addition to considering the product's own price, consumption decisions also involve consideration of prices both for available alternatives and for complementary products. The cross-price elasticity of demand measures how a change in the price of one product affects the

demand for another. In general, the cross-price elasticity is negative for substitutes and positive for complements.

Compared to the literature estimating own-price elasticity, fewer studies have estimated cross-price elasticity for either health insurance or health care services. Most of these studies address the demand for specific types of medical services such as nursing home care (with respect to the price of substitutes, such as home care or adult foster care) or orthodontic services (with respect to the price of complementary basic dental care).

Some studies consider "switching" behavior among private health insurance plans with comparable benefits, but they typically examine only the probability of switching *out* of a plan in response to an increase in the plan's own price. Consequently, we include these studies in the discussion of own-price elasticity.

3. Income Elasticity

The income elasticity of demand measures consumer response to a change in their level of income, all else (including price) being equal. However, because all studies that provide estimates of income elasticity are observational, the income elasticity of demand for either health insurance or health care services is measured as differences in demand attributable to differences (not changes) in income. In general, products that are considered necessities—such as health care—are income-inelastic; that is, demand for the product is relatively stable, despite differences in income. In contrast, the demand for discretionary services (e.g., some cosmetic surgeries) may be quite income-elastic. Relatively few studies have estimated the income elasticity of demand for either health insurance or health care services.

B. FACTORS THAT CONTRIBUTE TO VARIATION IN ELASTICITY ESTIMATES

The literature measuring the elasticity of demand for health insurance and health care services is voluminous. It offers a confusing array of estimates for policymakers seeking to

understand consumer responses to changes in price or income, and occasionally it offers estimates that conflict. Even when estimating the same population's responsiveness to a change in the price of the same product, two studies may offer incomparable estimates of elasticity for a number of reasons:

- ***The Calculation***. In general, all elasticity estimates are expressed as the ratio of a change in the quantity demanded and a change in price or income. However, researchers have used different formulas to calculate both the numerator and the denominator. Any of four presentations of elasticity—point elasticity, arc elasticity, semi elasticity, or take-up elasticity—are common in the literature. Each has advantages and limitations, and each generates different values of elasticity for the same change in price or income. In addition, the derivation of an elasticity measure dictates how it can be used in modeling. (For example, an arc elasticity cannot be dropped into a point elasticity equation [Peterson 2005]). Because researchers estimate arc elasticities as a convention, we presume that reported elasticity estimates reflect the calculation of an arc elasticity, unless it is otherwise noted.

- ***The Definition of Demand***. Even when estimating demand for seemingly the same product, researchers may use different definitions of demand. For example, the demand for health care services may be defined as the dollar amount of expenditure, the units of services used, or the probability of using any service. The data that are available for the study often determine how demand is defined.

- ***The Measure of Price***. Price also may be measured differently. With respect to the demand for insured health care services, differences in measures of price generally reflect the complex cost sharing in health insurance products. Different estimates of elasticity may reflect different measures of price—such as total premium versus employees' share of premium, or total out-of-pocket cost versus the copayment amount.

- ***The Magnitude of the Price Change***. Even with the same measure of price, consumers may respond differently to price changes of different magnitudes. A marginal change in price may motivate very little demand response, whereas a large price change may motivate a very different response. Constrained by available data or the experiment or intervention itself, an elasticity estimate derived from analysis of a small price change may be inappropriate to circumstances where the price change would be much larger.

- ***The Delivery System and Market Environment***. The health care delivery system and market environment are likely to influence the strength of the demand response to a change in price or differences in income. For example, demand response may be less in an HMO setting than in unmanaged fee-for-service systems, and consumers may be less responsive to price increases in markets with direct-to-consumer drug advertising.

- ***The Study Design***. To estimate an elasticity, researchers ideally would observe an exogenous change in either price or income, with no change in any other factor that would affect demand. However, researchers generally have lacked this ideal situation and have taken various alternative approaches to estimating elasticities. A study that uses a random-assignment experimental design (the most sound but costly way to observe response to change) is likely to produce a different estimate than a study that uses a quasi-experimental or observational design.

- ***The Data Source and Study Period***. Elasticity estimations may be derived from various types of data—primary or secondary, survey or administrative, cross-sectional or longitudinal, local or national. Each has different strengths and limitations. They may define key variables differently and also introduce different types and magnitudes of measurement error. Largely determined by available data, the study period may also affect estimates of elasticity. In general, estimates based on more recent data are more likely to be more relevant for policy development.

- ***The Empirical Method.*** Studies that define demand and price in the same way, calculate elasticity in the same way, and observe the same time period with the same source of data still can produce very different estimates if they use different empirical methods. Researchers have developed econometric models of increasing complexity to deal with problems such as selection bias, a problem commonly associated with observational data.

Considering the many factors that affect the estimation of elasticity, no single estimate of price or income elasticity is likely to apply in all circumstances and to all populations. Instead, differences in how estimates are calculated typically limit how they should be applied in modeling policy proposals and in drawing conclusions. In this report, we attempt to define the range of elasticity estimates offered in the research literature, with respect to health insurance and health care services generally, and for specific products and subpopulations.

III. PRICE ELASTICITY OF DEMAND FOR HEALTH INSURANCE

This chapter presents a range of estimates of the price elasticity of demand for health insurance. Because most Americans under age 65 obtain health insurance through their employers, many studies have estimated the demand for employer-based coverage. We begin by reviewing studies that estimate employers' demand for coverage—in particular, the factors that affect whether small employers offer coverage to their employees. We then consider studies that estimate the effect of the amount of premium paid by employees on their decisions to take up an offer of coverage and their propensity to switch health care plans when premiums change. Finally, we consider estimates of price elasticity for individual (non-group) coverage and public coverage (including Medicare). Each section offers information on the range of elasticity estimates, differences in estimates by population characteristics, and methodological issues and concerns. A summary is provided at the end of the chapter.

A. EMPLOYER OFFER

The offer of employer coverage varies widely by firm size and, to a lesser extent, the wage level of the workforce. Many policy proposals target employers who don't currently offer health insurance using the price reductions in order to expand workers' access to group coverage.

1. Range of Estimates

Several studies have attempted to estimate employers' demand for health insurance (expressed as employers' decisions to offer coverage to their employees). Some focus on the potential effects of reduced price (typically due to a greater tax subsidy) across all employers; others focus specifically on small employers.

Estimates of price elasticity of employer offer vary substantially, ranging from –0.14 to –5.8, although many estimates center around –0.6 (Table III.A). The wide range of estimates

reflects, in part, the use of very different data sources (some specific to a particular geographic area), as well as differences in how price is measured and the methodological approach taken. Generally, however, the demand for health insurance by employers is inelastic.

TABLE III.A

SUMMARY OF RECENT STUDIES ON THE PRICE ELASTICITY OF DEMAND FOR HEALTH INSURANCE – EMPLOYER OFFER

Study	Population	Demand Measure	Price Variation	Elasticity Estimate
Leibowitz and Chernew (1992)	Firms with fewer than 50 employees	The probability of a firm offering insurance coverage	(1) Variation in tax rates across states (2) Variation in premium quotes across locations	(1) –2.9 (2) –0.8
Feldman et al. (1997)	Firms with fewer than 50 employees in Minnesota	The probability of a firm offering insurance coverage	Imputed premium faced by firms, based on observed premiums	–3.91 (single coverage) –5.82 (family coverage)
Royalty (2000)	Employees in firms of all sizes	The probability of an employee getting insurance offer from employers	Variation in marginal tax rates across states	–0.63
Gruber (2001)	Employees in firms of all sizes	The probability of an employee getting an offer and being eligible	Simulated tax price of insurance for individual workers across states and over time	–0.6
Marquis and Long (2001)	(1) Firms with fewer than 100 employees (2) Firms with more than 75% low wage workers	The probability of a firm offering insurance coverage	Cross-section variation in prices, with direct information on premium quoted to employers without offer	(1) –0.14 (2) –0.25
Hadley and Reschovsky (2002)	Business establishments with fewer than 100 employees	The probability of an establishment offering insurance coverage	Imputed premium faced by firms, based on observed premiums	–0.54
Kronick et al. (2004)	Firms with fewer than 50 employees that didn't currently provide insurance	The proportion of eligible employers who purchased the product	Premiums were experimentally varied with a randomized controlled trial	-0.14
Gruber and Lettau (2004)	Firms of all sizes	(1) The probability of offering insurance coverage (2) Expenditures for insurance conditional on offer	Variation in tax subsidies across workers of different income levels, over time and across states	(1) -0.25 (2) -0.7

Research on price elasticity of employer offer usually measures the price of insurance as either the premium amount or the tax subsidy to the employer-paid portion of the premium.[1] The latter is more common, simply because the premium available to firms that do not offer insurance typically is unobservable. Studies that observe differences in the tax subsidy to estimate elasticity of employer offer generally examine whether those firms with higher tax subsidies are more likely to offer insurance. They assume that other components of price variation are correlated (and can be controlled for) with firm characteristics, such as number of employees and industry group—potentially contributing significantly to estimation error. Typically, they observe differences in the average "tax price" of insurance for employed workers (one minus the relevant marginal personal tax rate) to estimate the elasticity of employer offer. However, they may differ with respect to the amount of variation in the "tax price" that they observe (only cross-sectional variation or variation over time as well), and the method used to identify the representative "marginal" employee whose tax price motivates an employer decision whether to offer coverage.

For example, Royalty (2000) considered the variation in marginal tax rates across states. Using Current Population Survey (CPS) data[2] from 1988 and 1993, she estimated an offer elasticity of –0.63 across all sizes of firms. Gruber and colleagues investigated the impact of tax subsidies on firms' decisions to offer insurance and on their expenditures for insurance conditional on offer (Gruber 2001; Gruber and Lettau 2004). Having statistically matched CPS data (from the mid-1980s to the 1990s) to other person-level data, they imputed marginal tax

[1] Employer-sponsored health insurance is not considered taxable income: employer contributions to health insurance are excluded from the taxable base for purposes of both income and wage taxation. Therefore, differences or changes in federal and state income tax rates in effect vary the after-tax price of health insurance.

[2] March CPS data only collect information on respondents' insurance coverage. However, occasionally, CPS has collected data on employer insurance offering and employee insurance eligibility for offered policies among

rates for workers in firms with different characteristics and in different states and years, and computed the tax-price of insurance. Gruber (2001) estimated a tax-price elasticity of worker eligibility for insurance (that is, a change in the probability that a worker would be both offered and eligible for coverage, with respect to a change in the tax-price of coverage) equal to at least –0.6. Gruber and Lettau (2004) found a smaller elasticity (-0.25) for insurance offer and a larger elasticity (–0.7) for insurance spending conditional on offer. Both studies consider firms of all sizes, but they rely on different sources of information about employer offer.[3]

Some researchers have estimated employer demand for insurance by imputing the insurance premium available to employers based on premium data from firms that offer insurance or by asking firms how they would respond to various hypothetical prices in order to estimate a demand function. Most of these studies focus on small employers, and are discussed in the section below.

2. Subpopulation Differences

Because small employers are the least likely to offer insurance coverage to their employees, many studies focus solely on small employers or compare the elasticity of offer in small firms to that in larger firms. These studies usually define small firms as those having fewer than 50 employees, as did the Health Insurance Portability and Accountability Act (HIPAA), but some define 100 employees as the cut-off point, reflecting the firm-size categories available in some datasets.

(continued)
workers, for example, in May 1988 and April 1993. Many researchers have used matched data between the March CPS and these supplement data to study employer offer decision.

[3] Gruber (2001) used workers' self-reported offer of coverage, and Gruber and Lettau (2004) used administrative data on firm offering status.

Similar to a method that Royalty (2000) later used, Leibowitz and Chernew (1992) observed variation in tax rates across states to examine the impact of after-tax prices on insurance offer by small firms (with fewer than 50 employees). Based on responses to an employer survey in 1989, they estimated a tax-price elasticity of –2.9. However, based on variation in the premium quotes obtained from small group insurers and statistically assigned to firms in their data, they estimated a much smaller elasticity of employer offer with respect to differences in premium, –0.8.[4]

Observing firms with fewer than 100 employees, Marquis and Long (2001) estimated a still lower premium elasticity, –0.14. Hadley and Reschovsky (2002) also found a relatively small premium elasticity of –0.54, based on a nationally representative survey of employers in 1997 and imputed premiums. In addition, they found the smallest employers (with fewer than 10 employees) were the most price-sensitive—with an estimated elasticity of –0.63. Similarly, Gruber and Lettau (2004) found that primarily smaller firms drove their estimates of tax price elasticity across all firms. They estimated an offer elasticity of –0.54 and a spending elasticity of –1.34 for firms with fewer than 100 employees, roughly twice the elasticity of offer among all firms.

We found only one recent study that used a randomized controlled trial to estimate small employers' responsiveness to price change. Kronick et al. (2004) observed selected small employers (with 2-50 employees) in San Diego that did not provide insurance and were offered an experimental opportunity to buy coverage for a subsidized premium. The estimated price elasticity of employer offer was –0.14—consistent with Marquis and Long (2001) and on the low end of estimates from other studies. Kronick et al. (2004) concluded that small employers that

[4] Also using data for small firms (fewer than 50 employees), Feldman et al. (1997) estimated extremely high premium elasticities of employer offer: –3.91 for single coverage and –5.82 for family coverage based on a 1993 survey of 2,000 employers in Minnesota. However, Hadley and Reschovsky (2002) pointed out the instrumental variable used in Feldman et al. (1997) suffered from endogeneity and resulted in upwardly biased elasticity estimates.

do not currently offer insurance are likely to be unresponsive to even a large reduction in premiums.

The level of workers' earnings is also an important factor in employers' decisions to offer insurance. Estimates of the price elasticity of offer among firms with a high percentage of low-wage workers (more than 75 percent of the firm's workforce) are greater than those for other firms (Marquis and Long 2001, Hadley and Reschovsky 2002).

3. Methodological Issues

For studies that attempt to examine the impact of tax policy, lack of complete tax information is the most significant challenge. Ideally, one would have person-level information on both federal and state marginal tax rates, as well as Social Security and Medicare payroll tax rates for all employees in the firm. However, with firm-level data, the characteristics of the employees that drive employers' benefits decisions are typically unobservable—and because employees' marginal tax rates vary by family income, it is difficult to determine which tax rate to assign at the level of the firm. Some studies statistically match limited employee information to a larger individual-level survey (such as the CPS) to impute an average marginal tax rate by firm.

Studies that depend on cross-sectional data to analyze firms' offer decisions usually can observe premiums only for firms that offer coverage. Researchers must then impute unobserved premiums for firms that do not offer coverage. The imputation of unobserved premiums typically relies on the use of instrumental variables that are correlated with premiums but do not correlate with firm demand.

However, the inability to observe premiums introduces at least two additional problems for researchers. First, the premiums paid by firms that offer insurance are likely to be systematically lower than the premiums quoted to firms that do not offer insurance. Reliable estimates of

elasticity must correct for this selection bias. Second, geographic areas with high prices for insurance may also be areas with a high demand of insurance (Gruber and Lettau 2004); that is, demand may influence market prices. To address this problem of endogeneity, researchers have used additional instrumental variables to estimate the elasticity of employer offer.

B. EMPLOYEE TAKE UP

Having received an offer of health insurance, employees must decide whether to take up the offer. Large majority of employees do take up the offer. However, the number of workers who decline an offer of employer-based coverage has grown over the past decade (Cutler 2002b), attributed in large part to significant increases in the employee premiums for coverage.

1. Range of Estimates

Unlike the literature on employer offer, recent studies that have estimated price elasticity of employee take up generally agree that the take-up elasticity is small: estimates range from -0.002 to –0.7, with most less than –0.1 (Table III.B).

Chernew and colleagues (1997) were among the first to examine how premium contributions affected take-up rates among single employees using a sample of small firms in seven cities; they estimated a premium contribution elasticity of –0.066. Blumberg et al. (2001) used nationally representative MEPS data in 1996 and estimated a similar price elasticity (-0.04) among workers who were candidates for family coverage, but an even smaller elasticity among single workers. Cutler (2002) estimated a similar price elasticity of take up (–0.09) with respect to employees' share of the premium. Each of these studies is based on observational data on premium variation. Due to the problem of endogeneity, these data are likely to produce either downward- or upward-biased elasticity estimates (Gruber and Washington 2005).

TABLE III.B

SUMMARY OF RECENT STUDIES ON THE PRICE ELASTICITY OF DEMAND FOR HEALTH INSURANCE—EMPLOYEE TAKE-UP

Study	Population	Demand Measure	Price Variation	Elasticity Estimate
Chernew et al. (1997)	Single low-income employees of small firms (< 25 employees) in seven cities	Probability of taking the insurance coverage offered by employees	Observed employee share of premium regardless of whether taking the offer	–0.07
Blumberg et al. (2001)	Employees in firms of all sizes	Probability of taking the insurance coverage offered by employees	Employee share of premium, (1) directly observed and (2) imputed	(1) –0.04 (2) –0.14 for family candidates
Gruber (2001)	Employees of all firm sizes with health insurance offer *and* eligibility	Percent of employees covered by employer-provided insurance	Simulated tax price of insurance for individual workers across states and over time	–0.7
Cutler (2002)	Firms of all sizes	Take-up rates among eligible employees	Employee share of premium	–0.09
Royalty and Hagens (2003)	Employees in a large firm	Probability of taking the insurance coverage offered by employees	Hypothetical employee share of premium	–0.005
Bernard and Selden (2003)	Full-time employees in firms of all sizes	Probability of having private coverage	Tax price of insurance	–0.582
Marton (2004)	Families offered at least one employer-sponsored coverage	Quantity of insurance consumed (measured by total premium)	Tax price of insurance	–2.18
Gruber and Washington (2005)	Federal employees	Probability of taking the insurance coverage offered by employees	Tax subsidy	–0.02
Honig and Dushi (2005)	Married employees in dual-earner households (1) wives (2) husbands	Probability of taking the insurance coverage offered by employees	Imputed employee share of premium	(1) –0.19 (2) –0.08
Polsky et al. (2005)	(1) Married and (2) single employees	Odds of declining employer-offered coverage and remaining uninsured	Imputed employee share of premium	(1) odds ratio= 1.023 (2) odds ratio= 1.035

In contrast, Royalty and Hagens (2003) used a unique dataset in which the variation in workers' out-of-pocket premiums was exogenous but hypothetical. Consistent with earlier findings, they estimated a price elasticity of insurance take up essentially equal to zero, much lower than the price elasticity of demand for other fringe benefits. Gruber and Washington (2005) capitalized on a natural experiment in 1994, when postal employees were allowed to pay the employee share of their health insurance premiums using pre-tax dollars. This study also estimated a very low take-up elasticity, approximately –0.02.

None of these studies accounted for the availability of coverage from alternative sources, such as from a spouse's firm. However, some recent analyses have considered elasticity in the context of choice. Polsky et al. (2005) analyzed the choice for employees with an insurance offer from their own-employer, an alternative source of coverage, and no coverage. Using a nationally representative household survey (the 1996 and 1999 Community Tracking Study [CTS]), they found that paying a larger share of premiums significantly increased the odds of that a worker would decline an employer offer of coverage and remain uninsured.[5] Simulating the effect of reducing the employee share of the premium to zero, they found a smaller price effect compared to other studies, and attributed the difference to the fact that their model considered available alternative sources of coverage.

2. Subpopulation Differences

Honig and Dushi (2005) also considered employee take up in the context of choice, and estimated the elasticity of the take up of coverage from a worker's own employer with respect to out-of-pocket premiums separately for wives and husbands. They estimated a price elasticity of

[5] Polsky et al. (2005) estimated an odds ratio of 1.023 for married workers and 1.035 for single workers—meaning that when the employee share of premiums increased by 1 percentage point, the probability that the worker declined an employer offer of coverage and remained uninsured was 2.3 percent higher (P x 1.023).

demand equal to –0.19 among wives and–0.08 among husbands, suggesting that own-employer take up among husbands is less sensitive to price than own-employer take up among wives. Other research has found candidates for family coverage to be more price-responsive than single workers (Blumberg et al. 2001). Estimating worker-level coverage (not only direct take up, but coverage from any source), Bernard and Selden (2003) found significantly greater price responsiveness among workers in small firms as well as among workers with lower income, lower health risk, or both.

3. Methodological Issues

As with studies of employer offer, most studies of worker demand for employer-based coverage are observational, not experimental. As a result, they usually must deal with the absence of price data for workers who decline coverage, making it necessary to impute price for these workers based on their characteristics.

Here again, the imputation of prices introduces potential endogeneity bias from two sources. First, workers who select jobs with an affordable offer of health insurance may have a greater demand for insurance that may not be observable in terms of the measures that are available (Monheit and Vistness 1999). In short, their health plan premiums may be correlated with unobservable components of their demand for insurance. Second, the quality of insurance plans offered by employers is usually unobservable, and it may be correlated with the price. If so, the price elasticity estimate is biased toward zero.

While instrumental variables may be used to address these endogeneity problems, finding the right instrumental variable (one that is correlated with the endogenous variable but uncorrelated with the dependent variable) can be very difficult. For example, Cutler (2002b) used the state's average marginal tax rate as the instrumental variable for the employee premium share, but it may be inadequate as an instrumental variable: it may reflect the demand for

insurance, either because demand is a function of state income or because policymakers respond to insurance tastes in setting state tax rates (Gruber and Washington 2005).

However, estimates based on exogenous price changes may have limitations that outweigh the advantages of avoiding endogeneity. For example, workers may respond differently to a hypothetical choice compared to an actual choice. Alternatively, results from experiments conducted on a small scale may not be representative of results that would be obtained in the general population.

C. EMPLOYEE CHOICE OF PLAN

Many mid-sized or large employers offer more than one plan, allowing the opportunity to measure the propensity of workers to switch among health plans in response to a change in price. As a result, there is a relatively large literature estimating the price elasticity of demand with respect to alternative plan choices offered by employers.[6] This literature is particularly important for understanding the potential of managed competition, when employers or government programs may foster competition among plans to constrain the cost of coverage. Managed competition has taken on a new dimension with the introduction of consumer-directed health plans (CDHP) as a plan option. While research on the demand for CDHPs generally has focused on the experience of a few large groups, a small number of studies provide some early insights about how consumers in general may respond to the offer of a CDHP. These studies are reviewed at the end of next section.

1. Range of Estimates

A large number of studies have estimated the effect of employee premium contributions (price) and other factors on employees' enrollment decisions when given a choice of plans.

[6] While individuals in the non-group market also face a choice of plans, this elasticity has not been studied.

Typically these studies rely on data from one employer—such as the federal government—or several employers in the same geographic market. These studies consistently find that the average consumer is moderately sensitive to differences in price among comparable plans, but their demand is still inelastic. The studies that estimate a price elasticity typically express it as the percentage change in the probability of choosing a particular plan (or the percentage of employees enrolled in a particular plan) associated with a percentage difference in the price of the plan (usually measured as employees' out-of-pocket premiums).

The magnitude of the estimates can be quite different, but they usually are in a range between zero and –0.75 (Table III.C). This range may be partly explained by the different alternative choice sets that employees faced in each study, making direct comparison of the estimates difficult.

Barringer and Mitchell (1994) estimated the effect of changes in premiums and deductibles on employees' preferences among four types of health plan plans. Based on observations from a single company with four plants across the United States, they estimated that a percentage change in one plan's market share with respect to a 1 percent change in its price in the range of –0.1 to –0.2. In addition, they found that the elasticity of demand with respect to a difference in the plan deductible was much smaller than the elasticity of demand with respect to a difference in premium.

Goldman et al. (2004) also used data from a single large U.S. company with employees in 47 states in 1989 and 1991. They estimated the probability that an employee would drop coverage or switch plans in response to increases in employee premiums in one of the plans. They did not estimate standard price elasticities, but found that a 10 percent increase in premium induced 7 percent of single employees to drop coverage and another 13 percent to switch to another plan.

TABLE III.C

SUMMARY OF RECENT STUDIES ON THE PRICE ELASTICITY OF DEMAND FOR HEALTH INSURANCE—EMPLOYEE CHOICE OF PLAN

Study	Population	Demand Measure	Price Variation	Elasticity Estimate
Barringer and Mitchell (1994)	Employees in a company with four plants across the U.S.	Market share of one FFS plan competing with two other FFS plans and one prepaid group plan	(1) Premium increase in the FFS plan; (2) Doubling deductible in the FFS plan	(1) –0.1 to –0.2 (2) 3 to 4 percentage points reduction in market share
Buchmueller and Feldstein (1997)	University of California employees	Switching rate from current plan (multiple HMOs and a PPO)	Employer switch to a defined contribution benefit that raised the employee share of premium for some employees but not others	A $10 increase in premiums caused 26% of employees to switch plans
Cutler and Reber (1998)	Harvard University employees	The probability of taking up more generous coverage	Relative price change due to university policy change	–0.3 in the first year, and –0.6 in the second year
Royalty and Solomon (1998)	Stanford University employees	The probability of choosing among competing HMO and POS plans	Employee share of premium across competing plan choices	–0.55
Strombom, Buchmueller, Feldstein, (2002)	University of California employees	Market share of competing HMO and PPO plans	Employer switch to a defined contribution benefit that raised the employee share of premium for some employees but not others	For the average plan, a $5 increase in premiums decreased market share by 5%
Goldman et al. (2004)	14,221 employees in a single large firm	Rate of switching from current plan	Increases in employee share of premium	10% premium increase caused 13% to switch to another plan, 7% to drop

Using panel data on Stanford University employees, Royalty and Solomon (1998) estimated an average price elasticity of –0.55 with respect to a change in employees' share of the premium. Similarly, Cutler and Reber (1996) used data on Harvard University employees to investigate enrollment decisions when the relative prices of an HMO and a PPO changed due to an

exogenous change in university policy. They estimated the out-of-pocket premium elasticity of demand for the PPO plan to be –0.3 in the first year and –0.6 in the second year. Using a similar natural experiment design and data from the University of California system, Buchmueller and Feldstein (1997) estimated that 26 percent of enrollees would switch to another plan when the employee share of premiums for one plan rose by $10 per month.

Atherly et al. (2005) considering sensitivity to price among enrollees in PPO plans versus HMOs. They concluded that PPO enrollees were more sensitive to a change in price than HMO enrollees, but only with respect to enrolling in another PPO option; PPO enrollees were unlikely to switch to an HMO.

Finally, Parente et al. (2004, 2005) are among a very few researchers who have conducted early analyses of the price elasticity of demand for CDHPs. Parente et al. (2004) estimated a health plan choice equation for University of Minnesota employees, who in 2002 were offered a CDHP and three alternative health plans. Measuring the premium elasticity as the percentage change in the probability of choosing the CDHP in response to a 1-percent change in the tax-adjusted out-of-pocket premium, they estimated an elasticity of –0.786 among family-contract employees with no chronic condition. This estimate is much higher than the estimated premium elasticity (–0.155) among same types of employees who chose the HMO option.

Parente, et al. (2005) used a subsequently larger sample of pooled health plan choice data from three large employers participating in a Robert Wood Johnson Foundation (RWJF) funded study of CDHPs to estimate both own-price elasticity and cross-price elasticity for the take-up of any health insurance. Focusing on the Health Reimbursement Account (HRA) option, they estimated four types of own-price elasticities: a tax-adjusted employee premium elasticity (–0.92), an coinsurance rate elasticity (–0.54), an elasticity with respect to the difference (or "doughnut hole") between the deductible and the health account (–0.24), and an elasticity with

respect to the size of the HRA (0.09). The concluded that consumers may be more sensitive to changes in coinsurance than to changes in the doughnut hole structure. Moreover, they concluded that tax credits targeted to Health Savings Accounts (HSAs) may be effective in increasing the take-up of insurance among the uninsured in general, but much less effective among those with lower incomes.

2. Subpopulation Differences

Large differences in the price elasticity of plan switching have been associated with differences in health status, age, and job tenure. For example, the price elasticity among younger, recently hired employees who are in good health—and presumed to face the lowest non-price switching costs, such as quality uncertainty and provider change—are two to four times larger than those estimated for older, incumbent, and less healthy workers (Royalty and Solomon 1999; Strombom et al. 2002). Single employees are more likely to respond to premium increases by dropping coverage altogether, whereas families tend to switch to another plan (Goldman et al. 2004). Everything else being equal, the tax exemption of expenditures for employer-based health insurance may explain some of these differences, especially when family income is not observable.[7]

Regarding the choice of CDHP in a multiplan, multiproduct setting, Parente et al. (2004) found that the CDHP attracted higher-income employees and those who found unrestricted choice among providers more appealing—not necessarily young and healthy employees or families. Among employees or families with chronic conditions, the price elasticity of demand for the CDHP was greater than among those without a chronic condition.

[7] Dowd et al. (2001) observed that the tax exemption of premiums substantially reduces price responsiveness in choice of health plans, especially at higher incomes (and higher marginal tax rates).

3. Methodological Issues

With respect to estimating the elasticity of switching, the endogeneity of premiums is once again a concern. Since much of the health plan choice literature is based on cross-sectional data, allowing premium variation to be observed across plans; typically the quality of the plans (benefit design and the provider network) is unobservable. Because it is likely that these unmeasured plan attributes are correlated with premium, the resulting estimates of price elasticity probably are biased. In addition, knowing what plan options actually are available to employees is critical. Feldman et al. (1989) demonstrated that including employees who had different (but unobserved) insurance options produced biased estimates of price elasticity.

The unobserved cost of switching plans also complicates the estimation of price elasticity. Because consumers who switch plans may incur significant costs unrelated to price—such as uncertainty about the quality of the new plan and the possible change of providers—some may prefer to remain in their current plan even if the price of another plan is a lower. The failure to observe switching costs probably biases estimates of price elasticity downward. To account for switching costs that may be related to certain personal characteristics (such as age and health status), some researchers have developed multivariate models that interact premium variables with employee characteristics. These interacted variables allow for a heterogeneous response to price related to potential differences in switching costs.

Finally, people with higher than average expected health care expenditures may enroll disproportionately in a more generous plan option. Subsequently, adverse selection may cause premiums to increase and enrollees with low expected expenditures to respond by switching out of the plan. As a result, adverse selection may cause the long-run elasticity of switching in response to price to exceed the short-run elasticity.

D. INDIVIDUAL DEMAND IN THE NONGROUP MARKET

As not all uninsured have access to an offer of coverage from employers, a number of public policy proposals have focused on subsidizing coverage in the nongroup market. In general, these proposals would offer tax credits or other price incentives to stimulate the purchase of individual health insurance. Estimates of the potential impact of these proposals rely on an understanding of consumer response to a change in the price of individual coverage.

1. Range of Estimates

Relatively few studies have estimated the price elasticity of demand for individual (or non-group) coverage. Each of these studies is based on observation of a different population group—for example, self-employed workers without access to group coverage versus uninsured individuals—but collectively they suggest that the elasticity of demand for individual coverage is generally in the range of –0.2 to –0.6 (Table III.D).

Marquis and colleagues were among the first researchers to estimate price elasticity in the non-group insurance market. Based on responses to hypothetical insurance offers, Marquis and Buchanan (1992) estimated a price elasticity of –0.5 among families. Marquis and Long (1995) linked a price list from a major insurer in the nongroup market to individuals (based on residence, age, and gender) and estimated a price elasticity of demand in the –0.3 to –0.6 range among working families without group coverage. Marquis et al. (2004) constructed a premium that would likely to be paid by a standardized population based upon the actual premiums and coverage offered by the three largest individual insurers in the state of California—and again estimated a price elasticity in the range of –0.2 to –0.44 among families without group coverage, depending on the data source used.

TABLE III.D

SUMMARY OF RECENT STUDIES ON THE PRICE ELASTICITY OF DEMAND FOR HEALTH INSURANCE—INDIVIDUAL DEMAND IN THE NONGROUP MARKET

Study	Population	Demand Measure	Price Variation	Elasticity Estimate
Marquis and Buchanan (1992)	All families	Probability of being covered by individual insurance	Hypothetical insurance offers with different levels of premium	–0.5
Gruber and Poterba (1994)	Self-employed families	Probability of being covered by individual insurance	Tax subsidy	–0.34 to –0.69
Marquis and Long (1995)	Families without group offer	Probability of being covered by individual insurance	Variation in premium quotes across locations	–0.3 to –0.6
Marquis et al. (2004)	Families without group offer in California	Probability of being covered by individual insurance	Constructed premiums based on quotes from 3 largest insurers in CA	–0.2 to –0.4
Congressional Budget Office (2005)	Employees without group offer	Probability of being covered by individual insurance	Imputed premiums	–0.57

Gruber and Poterba (1994) used the Tax Reform Act of 1986 (which reduced the after-tax price of individual insurance for the self-employed) as a natural experiment to measure the price response among families of self-employed workers. They estimated semi-elasticities (that is, the number of points that the insured percentage of the population would change if the after-tax price of insurance rose by 1 percent) in the range of –0.34 to –0.69, depending on of the econometric specification.

The Congressional Budget Office (CBO 2005) used the tax deductibility of premiums for self-employed individuals as well as the effect of state-level premium compression due to community rating regulations to impute individual premiums. This approach produces an elasticity estimate of –0.57 among single workers without access to group insurance. They also estimated a "take-up" elasticity of –0.084 (which translated to a 4.2 percent reduction in the uninsured in response to a 50-percent premium subsidy)—a magnitude consistent with that

estimated by Marquis et al. (2004).[8] Among workers offered group insurance, a decrease in individual premiums has very small effects on the decision to purchase individual coverage instead of group coverage (Marquis et al. 2004).

2. Subpopulation Differences

With respect to differences among population subgroups, Marquis et al. (2004) estimated that younger (under age 35) self-employed workers with incomes below 200 percent of the federal poverty level (FPL) were much more price sensitive (with an elasticity estimate of –0.7 to –1.2) than older employed workers with incomes above 400 percent FPL (with an elasticity estimate of –0.03 to –0.07). In addition, individuals with health problems appear to be less responsive to premium changes (CBO 2005), as are married adults compared to single adults (Gruber and Poterba 1994).[9]

3. Methodological Issues

Estimating price elasticity in the non-group market has proven to be even more difficult than estimating the group-market elasticities. In nearly all states, premiums in the non-group market are directly related to the individual's characteristics and therefore are endogenous.[10] To overcome this problem, researchers have attempted to construct exogenous premium schedules based on insurers' offers and individual characteristics (e.g., Marquis et al. 2004), or they have

[8] In contrast to studies that examined the effect of price change on the probability of being covered, Reschovsky and Hadley (2004) compared out-of-pocket spending for health care among lower-income uninsured people with the amount they would have spent on insurance and health care combined, if they had taken any of three hypothetical tax credits. Based on the CTS Household Survey, they estimated premiums for the target population, and found that nearly all eligible uninsured people would pay higher health-related costs if they took advantage of tax credits of the size considered in recent proposals. This finding offers some insight into a low tax credit might stimulate very modest take up among those low-income who are now uninsured.

[9] Gruber and Poterba (1994) estimated price elasticities among single persons that were much higher (-1.8 semi-elasticity) than those among married persons (essentially zero semi-elasticity).

[10] Only in New York and Vermont, which require pure community rating in the nongroup market, would premiums be unrelated to the policyholder's own characteristics.

relied on natural experiments related to some change in public policy (e.g., Gruber and Poterba 1994).

E. DEMAND IN PUBLIC PROGRAMS

Few studies have attempted to estimate the price elasticity of demand for coverage in public programs, largely because premiums are typically not charged or they are very low. However, greater use of premiums in public programs is emerging. For example, Medicare Advantage (formerly Medicare+Choice) plans may charge premiums, and some State Children's Health Insurance Programs (SCHIP) charge modest premiums. Since public programs generally provide health care coverage to vulnerable populations—such as the elderly, children, disabled adults, and low-income families—understanding how they will respond to a change in price is extremely important in avoiding disruptions in coverage and access to medical care.

1. Medicare

We found just one study that used person-level data to estimate premium and benefit elasticities with respect to health plan choice in the Medicare program (Atherly et al. 2004). This study combined observations from the Medicare Current Beneficiary Survey with Medicare Compare plan data to estimate the effect of benefits, premiums, and health risk on beneficiaries' selection of an M+C plan versus fee-for-service (FFS) Medicare, as well as the selection among competing M+C plans. The study estimated an out-of-pocket premium elasticity of –0.134—that is, a $10 increase in premium was associated with a 0.62 percentage points drop in a plan's market share. Most of this response was attributed to switching among M+C plans (-0.12), not switching to FFS (-0.01). This elasticity is within the range of those estimated in the private market. However, the authors noted that their estimate was based on a fairly small range of premiums and may not be generalized to benefit packages substantively different from the ones observed in the study.

Two other studies that shed light on plan choice in Medicare used data on retirees in employer-sponsored health benefits programs. Buchmueller (2000) examined how University of California retirees responded to changes in out-of-pocket premiums caused by a change in the University's premium contribution. He estimated price elasticities in the range of –0.12 to –0.24, depending on the type of plan the retirees was in at the time of the change. In a similar study, using retiree data between 1997 and 2002 from an employer with roughly 2,700 employees located in the Southwestern United States, Buchmueller (2005) estimated elasticities ranging from –0.14 to –0.37, slightly higher than his previous estimates. He attributed the difference to the latter study's higher level of variation in price, which depends (exogenously) on when the individual retired and his or her years of service as of that date. In addition, Buchmueller (2005) noted that the premiums observed in his study were higher than in the data used by Atherly et al. (2004), largely explaining the difference between their elasticity estimates.

2. Medicaid and SCHIP

Although Medicaid prohibits premiums for the categorically eligible population, some states charge monthly premiums to low-income beneficiaries in their Medicaid expansion programs (for noncategorical individuals) and in SCHIP. Evidence from a limited number of studies indicates that premiums reduce Medicaid participation and make it harder for individuals to maintain stable and continuous enrollment. These studies seem to indicate that price responsiveness among either Medicaid or SCHIP beneficiaries is much higher than among individuals in the private market.

Ku and Coughlin (1999/2000) examined participation rates among people eligible for Medicaid expansion programs and who faced premiums of differing levels. They found premiums set as low as 1 percent of a family's income lead to an approximately 15 percent reduction in public program participation. Shenkman and Vogel (2005) examined disenrollment

in response to premium increases in Florida's SCHIP program, and found a price elasticity for the disenrollment hazard rate of 2.2; that is, a 10 percent increase in the monthly premium would produce a 22 percent increase in the probability of disenrollment. The authors concluded that, at least in the short-term, SCHIP families are very price-sensitive and premium increases may differentially affect children in families with the lowest income and residents in rural areas.

Marton (2005) examined the impact of introducing a premium for families between 151 percent and 200 percent FPL on the duration of premium-paying SCHIP enrollment spells in Kentucky, drawing a natural control group from families not subject to the premium (those with income between 101 percent and 150 percent FPL). He found strong price responsiveness in the short run—the probability of disenrollment increased from 5 percent to 21 percent in the first two months after the premium was introduced—but weak responsiveness in the long run and no significant disenrollment among the control group. He concluded that the introduction of a premium for families with modest incomes reduced the length of enrollment.

3. Crowd-Out of Private Coverage

Crowd-out is a term that refers to the propensity of people to substitute public for (higher-cost) private coverage when both are available to them. We include crowd-out in the discussion of price elasticity of health insurance because it reflects a change in demand for private coverage as a result of its substitute (public program) becoming available at zero price; in this sense, crowd-out is a measure of the cross-price elasticity between public and private coverage.

The literature on crowd-out is extensive, but there is no consensus about whether crowd-out is significant (Davidson et al. 2004). Some studies have linked a reduction in private coverage to a gain in public enrollment following an expansion of eligibility for the public program. However, there are many reasons that people might lose private coverage other than crowd out:

they might work for employers who drop or change the offer of coverage, corresponding to an ongoing trend that may be unrelated to the availability of public coverage.

Evidence about crowd-out that may be related to changes in the employer offer of coverage for employees is relatively consistent. Cutler and Gruber (1996) used variation arising from differential timing of Medicaid expansions to compare employers' offer decisions from the late 1980s (before expansions) to early 1990s (afterwards). They found no evidence that employers were less likely to offer coverage when a higher proportion of employees or their dependents were eligible for Medicaid. Using data in the same period and focusing on small firms with fewer than 100 employees, Shore-Sheppard et al. (2000) drew the same conclusion about employers' offer of employee-only single coverage.[11] Marquis and Long (2003) confirmed again that there was no significant reduction of firms' offer rates overall when a state-initiated coverage program was expanded. However, they did estimate a 3.1 percent reduction in the rate of offer specifically among small, low-wage firms.

With respect to private coverage overall, the evidence regarding of the potential effect of expanded public coverage is very murky. Even within the same study, the range of estimates is so large that no conclusions can be drawn.

F. SUMMARY

A large number of recent studies have investigated consumers' price responsiveness in different segments of the insurance market, with most depending on observational data analysis and a few using natural experimental or experimental designs. In general, the demand for health insurance is price-inelastic. However, there is no further consensus about the magnitude of the

[11] However, they found that a 10-percent increase in the proportion of employees eligible for Medicaid reduced by 6 percent the likelihood that employers would offer coverage for dependents. They also found weak evidence of a negative effect of expansions on take up of employer-offered coverage.

price elasticity. Furthermore, the lack of suitable data drives many methodological issues that continue to complicate the estimation.

Nevertheless, our knowledge of how consumers react to price changes in the insurance market has improved, and the research literature supports a number of general conclusions about the demand for coverage:

- Current tax policy influences the offer of employer-sponsored health insurance significantly. Nevertheless, small firms are less likely to offer insurance and have a greater price elasticity than the average firm. Estimates of the price elasticity estimates of employer offer vary widely, but approximately center around –0.6.
- Among workers with an employer offer of insurance, the responsiveness of take up to price is relatively low: most price elasticity estimates are less than –0.1. This suggests that small changes in employees' out-of-pocket premiums have little impact on coverage.
- Depending on the number and similarity of available options, the price elasticity of switching plans among insured workers can be relatively large. In some circumstances, employees will switch plans in response to a small increase in out-of-pocket premiums. Conversely, unobserved high switching costs depress the elasticity of switching in response to differences in price.
- Price elasticity estimates for individual (nongroup) coverage typically are in the range of –0.2 to –0.6, suggesting that consumers are more sensitive to price changes in the non-group market than in the group market.
- The limited evidence available regarding price elasticity among Medicare beneficiaries suggests that elderly beneficiaries are not as price sensitive as younger consumers overall. No research has attempted to estimate price elasticity among disabled beneficiaries.
- Few empirical studies have attempted to estimate price elasticity among low-income beneficiaries enrolled in Medicaid or SCHIP. Available evidence, however, suggests that they are very responsive to premiums for coverage, reducing the probability that they will enroll as well as the duration of enrollment.
- Looking at Medicaid/SCHIP crowd-out of private coverage, there is no evidence that employers as a whole are less likely to offer coverage when a greater proportion of their employees or dependents are eligible for Medicaid—although small low-wage employers may be less likely to do so. With respect to the effect on private coverage overall, the evidence regarding crowd-out is unclear.

IV. PRICE ELASTICITY OF DEMAND FOR HEALTH CARE SERVICES

Most studies that address the price elasticity of demand for health care services consider only the insured population.[12] For this population, the design of insurance coverage—with deductibles, coinsurance, and copayments, as well as limits on the scope of covered services—determines the effective price that they pay for care. Because the effective price of care may differ for specific services and over time (as consumers exhaust their deductibles and limits on coverage), determining the price elasticity of demand for services is particularly complex.

In the following sections, we review estimates of the price elasticity of demand for health care in general and then discuss estimates for specific types of services such as prescription drugs, acute care, nursing home services, and other services. Each section is organized in the same way as in the previous chapter: first we discuss the range of estimates and estimates for different subpopulations and then turn to methodological issues and concerns. Special issues related to the demand for specific types of service also are discussed. Because the demand for one type of service may be related to another, cross-price elasticity estimates are presented as they relate to each type of service. The final section offers a summary of the chapter.

Despite the fact that the HIE was conducted almost 30 years ago and its design inevitably raises issues of external validity,[13] it remains the benchmark against which subsequent studies estimating price sensitivity of demand for health services are compared. This stature is a reflection of the methodological rigor of the project design (e.g., minimizing selection bias via a

[12] Studies that have addressed the demand for health services among the uninsured population date to the 1970s and suggest that uninsured consumers are more sensitive to price than insured consumers. For example, Holtman and Olsen (1978) found that price elasticity of demand for physician care was –0.164 without effective insurance coverage and –0.097 with effective insurance coverage.

[13] For example, the HIE is geographically limited, as it was implemented in only six sites, though the sites were chosen to include places that differed in important ways.

random assignment design) as well as the scope of services that it considered. Each of the following sections compares more recent estimates of price elasticity to those produced by the HIE.

A. OVERALL HEALTH SERVICES

A number of studies have attempted to estimate the demand for all health care services in the aggregate. These studies skirt various thorny issues for estimating demand, including the difficulty of observing the prices of specific services and the range of available service or treatment options. Taking a more generalized approach, they investigate consumer response to a change in out-of-pocket cost in terms of the change in their total health care bill.

1. Range of Estimates

Evidence from studies on price elasticity of overall health services consistently suggests that the demand for health care (like health insurance) is price-inelastic. These estimates typically range from –0.04 to –0.75, but generally center around –0.2. That is, they indicate that consumers reduce their total health care expenditures for care by 2 percent in response to a 10 percent increase in its price. These studies vary widely in the both the types of data and the measures of price that they use, but researchers have generally attributed price-induced changes in demand in large part to changes in the probability of accessing any care, not changes in the amount of care used once care is accessed (Ringel et al. 2002).

A series of analyses analyzing data from the HIE compared the use of health care by individuals who faced different combinations of deductibles, coinsurance rates, and out-of-pocket maximums (Manning et al. 1987; Newhouse et al. 1993). These analyses concluded that people with higher deductibles reduced their use of health care, and higher coinsurance rates

further reduced per capita expenditures for care.[14] Moreover, at lower levels of cost-sharing, the elasticity of demand for care was lower. Among people with a coinsurance rate less than 25 percent, the estimated out-of-pocket price elasticity was –0.17, compared with –0.22 among people with a coinsurance rate between 25 and 95 percent. In contrast, differences in out-of-pocket maximums did not significantly affect demand.

More recent studies on the responsiveness of health expenditures to cost sharing have relied on insurance claims data to estimate demand, in contrast to the random-assignment experimental method of the HIE. For example, Eichner (1998) used 1990-1992 insurance claims data from a single large employer to estimate consumers' response to the effective reduction in the price of care that occurs as plan participants reach their deductible. Eichner estimated a price elasticity of expenditures between -0.62 and –0.75, larger than most other estimates of this type.[15]

2. Subpopulation Differences

Analyses of the HIE found that lower-income consumers were more responsive to cost sharing than those with higher incomes. Participants with income in the lowest third of the sample and enrolled in the free plan were 34 percent more likely to use health services of any kind than low-income participants in plans with cost-sharing. Among those with incomes in the top third, this difference was only 22 percent (Manning et al. 1987).

More recent analyses of income-related differences in utilization have relied on observation of demand in public programs, which obtain information about household income. For population subgroups eligible for Medicaid and SCHIP—largely women and children—the

[14] A $3,200 family deductible (in 2004 dollars) with no additional cost sharing would reduce average medical expenditures by 31 percent, relative to a plan with free care (Morrissey 2005).

[15] As another example, using insurance data from the early 1990sto look at the effects of alternative deductibles among middle- to upper-income individuals in the Netherlands, Van Vliet (2004) estimated an overall deductible elasticity of –0.14. In this study, once the deductible was satisfied there was little or no out-of-pocket payment for services.

expansion of these programs reduces the prices they must pay for care to zero or nearly so, presumably increasing the amount of care they demand. For a congressionally mandated evaluation of SCHIP, researchers conducted surveys of enrollees and disenrollees in 10 states (Wooldridge et al. 2005). They found that, relative to their experiences before enrolling, SCHIP enrollees received more preventive care, had fewer unmet needs (for hospital, specialist, doctor, prescription drugs, or dental care services), and had better access to and communication with providers. The same evaluation found similar improvements in access to care among enrollees in Medicaid programs.

Several states have recently introduced nominal cost sharing in their Medicaid and/or SCHIP programs (Ku and Broaddus 2005). Observation of these programs offers evidence that even nominal increases in cost sharing within the program can reduce use of services dramatically. For example, in Utah's Medicaid program, the introduction of a $2 copayment per physician office visit reduced utilization from 600 visits per thousand enrollees to fewer than 500 visits per thousand enrollees within a year (Ku et al. 2004). In part because of their greater sensitivity to price, consumers with low incomes may be more vulnerable to adverse consequences from additional cost sharing. Because much of their care is not discretionary, low-income people with chronic health conditions may be most vulnerable (Ku and Wachino 2005).

3. Methodological Issues

Several methodological problems make it difficult to estimate the price elasticity of demand for health services difficult, even in the aggregate. These include the potential for adverse selection, unobservable effective prices and time prices, and potential for provider-induced demand.

Adverse Selection. Consumers who are more likely to use services also are more likely to select insurance plans that require them to pay less out-of-pocket, all else being equal. As a

result, simply comparing insured consumers with different levels of cost sharing is likely to produce an estimate of price elasticity that is biased upwards.

Random assignment of consumers to health plans (as in the HIE) avoids the problem of adverse selection, but such opportunities to implement a fully experimental design are rare. As a second-best strategy, researchers have either sought out natural experiments or they have used various econometric techniques (typically introducing instrumental variables) to deal with self-selection bias in observational data.

Health Care Prices and Time Prices. As described earlier, measuring the effective prices that consumers must pay for health care services is complex. It requires the analyst to control for multiple components of insurance plan design—deductibles, coinsurance rates, and copayment levels, as well as the scope of covered services. If the research design fails to control for any relevant component, the elasticity estimate will be biased. In general, omitted variable bias is likely to produce elasticity estimates that are too low.

In addition to effective price, the waiting time involved with using health care services—referred to as the time price—may further increases consumers' opportunity cost for care. However, there is little empirical evidence about the magnitude of the elasticity of demand with respect to time-price. One study using data from Netherlands estimated time price elasticities in the range of –0.09 to –0.14, measuring the value of time as the individual's wage, controlling for employment status (Janssen 1992). Failure to observe time price may further bias estimates of price elasticity downward, and it probably also reduces the efficiency (and, therefore, the apparent statistical significance) of price elasticity estimates.

Provider-Induced Demand. Finally, the role of providers may complicate the estimation of price elasticity. Providers not only supply health services, but they also act as agents of the patient. As suppliers, providers may respond to changes in demand triggered by a change in cost

sharing by changing their patterns of practice—for example, by prescribing fewer but more intense treatments. As the patient's agent, providers may either induce demand (to maximize revenue) or constrain demand (in response to payment incentives such as capitation). Studies that estimate price elasticity rarely account for provider behavior, or they include it in only the most general terms—for example, controlling for care provided through an HMO. Failure to control adequately for provider behavior may produce elasticity estimates that, while roughly correct in the aggregate, may offer little insight about consumer responses to price changes in different care environments.

B. PRESCRIPTION DRUGS

Many private and public health insurance plans have increased cost-sharing for prescription drugs for the purpose of reducing demand overall and encouraging the substitution of lower-cost drugs when possible. The introduction of greater cost sharing has offered researchers various opportunities in the form of natural experiments to study the impact of greater cost sharing on the use of prescription drugs. Nevertheless, programs that have developed more innovative cost sharing designs—such as that in the Medicare Part D program—have had very little research evidence to rely on.

1. Range of Estimates

Many insurance plans use "tiers" of cost sharing to control the use of pharmaceuticals. In general, tiered cost sharing imposes higher copayments for drugs that have generic or less costly equivalents. A number of recent studies have investigated the effects of tiered cost sharing on consumer behavior. All of these studies suggest that the overall demand for prescription drugs is price-inelastic, with estimates ranging from –0.10 to –0.60, depending on the data sources used (e.g., claims data from one employer or multiple employers) and the types of drugs considered (e.g., any drug or a specific class of drugs).

Results from the HIE indicated the average expenditure for prescription drugs in a plan without cost sharing ($82) was nearly twice as high as in the plan with a 95 percent coinsurance rate ($46) (Newhouse et al. 1993). In large part, this difference was driven by the number of prescriptions filled rather than a difference in the average cost per prescription.[16] The researchers concluded that the elasticity of demand for prescription drugs was –0.17, similar to the elasticity of demand for health care in general.

More recently, Smith (1993) used cross-sectional claims data to study the effect of an increase in copayments on the number of prescriptions purchased. He estimated a price elasticity of –0.10 with respect to the number of prescriptions filled, but found no effect on total expenditures for prescription drugs.

Motheral and Fairman (2001) examined the effects on prescription drug use among employees enrolled in a PPO plan, moving from a two-tier cost sharing plan for prescription drugs to a three-tier plan. Using a difference-in-difference research design, they estimated a copayment elasticity of –0.21 with respect to use and –0.24 with respect to expenditures. Also using a difference-in-difference approach, Gibson et al. (2005) compared employees facing an increase in the copayment for prescription drugs with employees for whom copayments had not changed, and estimated a much lower price elasticity (–0.04) with respect to use. They estimated a –0.03 cross-price elasticity between generic and brand drugs, confirming that generic drugs were substituted for brand-name drugs—a finding consistent with other studies as well (Goldman et al. 2004). Finally, they found that the copayment effect on prescription drugs utilization diminished after the initial reponse, suggesting that the long-run elasticity of demand is lower than the short-run elasticity of demand.

[16] In general, this result mirrors findings with respect to the impact of cost sharing on other service types—that is, cost sharing affects the probability of using any care, but not the cost of care once accessed (Ringel 2002).

Joyce et al. (2002) examined how a series of changes in cost sharing for prescription drugs affects total expenditures for pharmaceuticals—specifically, moving from a one- to a two- or a two- to a three-tier plan, doubling copayments in each tier, or requiring generic substitution. This study estimated copayment elasticities that ranged from –0.22 (from doubling copayments in a single-tier plan) to –0.40 (from doubling copayments in a three-tier plan). Adding a second copayment tier ($20 in addition to $10) reduced average spending by 19 percent, and adding a third level ($30) reduced average spending by an additional 4 percent. Requiring generic substitution in a two-tier plan reduced drug spending by 8 percent.

A few studies have estimated the elasticity of demand for drugs in specific therapeutic classes. Using claims data from 30 employers with 52 health plans between 1997 and 2000, Goldman et al. (2004) examined the effect of doubling the copayment for eight classes of therapeutic drugs. They found reduced utilization in all eight classes, ranging from 45 percent (for nonsteroidal anti-inflammatory drugs) to 25 percent (for anti-diabetic drugs). Lansman et al. (2005) studied the effect of introducing three-tier copayments and reached similar conclusions. They estimated a generally low copayment elasticity (-0.16 to –0.10) for drugs to treat on-going asymptomatic conditions, and a moderate copayment elasticity (-0.60 to –0.24) for drugs to treat symptomatic conditions.

2. Subpopulation Differences

Certain subpopulations (such as people with chronic illness, the low-income, and the elderly) are likely to have different price elasticity of demand for prescription drugs. This section summarizes the limited evidence for these subpopulations.

Persons with Chronic Illness. In general, people with chronic illness are expected to be less responsive to changes in copayments. Studying use of care by participants in plans sponsored (respectively) by 30 employers, Goldman et al. (2004) found that the use of disease-

specific medications was 8 to 31 percent lower among participants with chronic conditions such as diabetes compared to other participants. However, based on analysis of other multi-employer data, Gibson et al. (2005) found no significant difference in the copayment elasticity among participants with a chronic illness versus others, but did observe that participants with a newly diagnosed chronic illness were less responsive to a increase in the copayment.

Low-Income Consumers. Among low-income populations, the price elasticity of demand for prescription drugs may be particularly high. Tamblyn et al. (2001) studied the consequences of a policy change in Quebec that imposed copayments for prescription drugs on low-income adults receiving welfare. They found that fewer prescriptions for essential medications were filled after copayments were in place—and that the occurrence of adverse events and emergency room use increased sharply. A recent small survey in Minnesota produced similar findings: more than half of hospital patients covered by Medicaid or medical assistance reported that they had been unable to fill a prescription at least once in the last six months because of a $3 copayment for brand-name drugs copayments or a $1 copayment for generic drugs (Mendiola et al. 2004).

The Elderly Population. While the elderly population typically has greater need for prescription drugs, the research evidence about their response to price changes is extremely limited—in large part because Medicare has not covered drugs before the implementation of Part D. Combining data from Medicare Current Beneficiary Survey with Medicare billing records, Klick and Stratmann (forthcoming) examined the effect of different Medigap coinsurance rates on beneficiaries' demand for prescription drugs. They used an instrumental variables approach

to control for adverse selection and estimated a price elasticity of demand of –1.01 for number of prescriptions filled and –0.69 for total drug expenditures.[17]

3. Methodological Issues

An important methodological issue unique to estimating the price elasticity of demand for prescription drugs is the prevalence of direct-to-consumer advertising and marketing. At least two recent studies suggest that failure to control for marketing intensity may produce biased estimates of price elasticity. Comparing drug sales before and after the relaxation of restrictions on direct-to-consumer marketing in 1997, Ling et al. (2002) examined the effect of marketing intensity and order of entry on the market share of anti-ulcer and heartburn medications. They found direct-to-consumer marketing had a significant impact on market share, and even had a spillover effect to other drugs by the same manufacturer. Ridley (2004) confirmed this effect. Estimating the demand for prescription drugs as a function of copayments, drug prices, and drug marketing expenditures, he found that copayments explained the demand for prescription drugs more accurately than prices, and that failing to control for the effect of promotional spending biased the copayment elasticity downward by nearly 50 percent.

C. ACUTE CARE

A number of studies have measured consumers' price responsiveness with respect to use of acute care, such as inpatient hospital care (including emergency department services), physician services, dental services, and mental health services. Collectively, they suggest that the price elasticity of demand varies with the urgency of the care being sought, but the variation is less

[17] Grootendorst et al. (1997) is the only other study we found that examined prescription drug use among the elderly population, though in Canada. The authors examined drug expenditures before and after a Canadian drug subsidy program introduced reference pricing, which limited reimbursement for non-preferred drugs. They found that expenditures for prescription drugs dropped by about half, mostly due to substitution of low-cost drugs for more costly alternatives.

than one might expect. For example, the demand for inpatient care is relatively unresponsive to price changes, whereas price responsiveness of demand for mental health services is higher.[18] Consistent with their demand for health care in general, lower-income people are more sensitive to changes in price for any type of service than are higher-income people.

1. Inpatient and Outpatient Services

The most comprehensive analyses of the effect of price on the demand for inpatient and outpatient services still are based on data from the HIE. Using HIE data, Newhouse et al. (1993) estimated a price elasticity of demand of –0.17 for both inpatient and outpatient services when coinsurance rates were less than 25 percent. With higher coinsurance rates (25 to 95 percent) the demand for inpatient services was slightly less price-elastic (–0.14) and the demand for outpatient services was more price-elastic (–0.31). The HIE found no evidence that inpatient services substituted for outpatient services. To the contrary, Manning et al. (1987) concluded that inpatient and outpatient services might be complementary.

More recent studies have produced estimates of price response with respect to the use of either inpatient or outpatient services that are difficult to compare with the elasticity estimates from the HIE. Cherkin et al. (1989) examined the effects of a $5 copayment introduced in 1985 on the use of physician office visits for employees in Washington and found that the total visits declined by 8.3 percent. Primary care visits were reduced most, and specialty visits were reduced the least.

Using a natural experiment offered by a transition to managed care in the military system, Goldman (1995) compared military beneficiaries' use of inpatient and outpatient care between

[18] Fewer studies have estimated price elasticity of preventive care demand, but limited evidence suggests that it may be higher than that for acute care. Analysis of HIE data showed that at higher coinsurance rates (25-95 percent), the price elasticity of demand for preventive care was –0.43 and for acute care it was –0.32. At lower coinsurance rates (0-25 percent), the price elasticities were similar.

those enrolled in an HMO (which involved lower out-of-pocket costs) and those enrolled in a fee-for-service (FFS) plan. He found that the demand for outpatient care was 16 percent greater in the HMO (largely related to a greater incidence of any use, not more visits per person) than in the FFS plan, but there was no difference in the probability of an inpatient admission.

2. Emergency Department Services

While the HIE found little difference in price elasticity between emergency departments visits and the general ambulatory care, more recent research has found a significant difference. Examining emergency department use in an HMO, Selby et al. (1996) considered the effects on the number of emergency department visits associated with the introduction of a $25 to $35 copayment. They found that emergency department visits declined by 14.6 percent among those enrollees facing the new copayment (controlling for other factors) and still larger reductions in visits for conditions that the investigators deemed "often not an emergency." They also observed a reduction in office visits although there was no change in the copayment for office visits, a finding that suggests that emergency department visits and office visits (similar to inpatient and outpatient care) may be complementary rather than substitutes.

3. Mental Health Services

The inconsistency of the research evidence on the elasticity of demand for mental health services may reflect both changing perceptions about the use of mental health services and improving coverage for these services. Analyses of the HIE suggested that the demand for mental health care was as price-sensitive as the demand for other acute care, especially at low levels of coinsurance. At a higher level of coinsurance, the demand for mental health care was about twice as responsive to price as general medical care. However, since the HIE, the changes in treatment protocols and the reduced stigma associated with mental health care have likely changed the elasticity of demand for these services.

Examining use of mental health services in the 1980s, some observational studies estimated the price elasticity for mental health services at about –1.0, much higher than that for acute care in general (McGuire 1981; Taube et al. 1986). In contrast to the elasticity of demand for other services, at least one study found that the intensity of mental health use (number of visits per user) declined more in response to an increase in price than did the probability any service use (Horgan 1986). However, each of these studies may have overstated the price elasticity by ignoring the potential for adverse selection.

With 1991 data from an HMO, Simon et al. (1996) observed a natural experiment to estimate the price elasticity of demand for mental health services, finding that the probability of using any mental health care declined just 0.17 to 0.28 percent in response to a 1-percent increase in copayment for these services. Unlike the HIE, Simon and colleagues found very little effect on intensity (number of visits per user) associated with the introduction of the $20 copayment.

Finally, men and women may respond differently to changes in the price of mental health services. Wallen et al. (1986) estimated a price elasticity of –0.50 for men compared with –0.31 for women.

4. Dental Services

Most of what is known about the price elasticity of demand for dental services is based on studies prior to 1990s. Analysis of HIE data found 34 percent more visits and 46 percent higher expenses among people with no coinsurance than among those in the plan with 95 percent coinsurance (Newhouse et al. 1993). The largest difference was observed between those with free care and those with a 25 percent coinsurance rate—suggesting that having dental insurance coverage at all plays a much bigger role in the demand for care than a change in the price of care once insured.

Compared to other services, the price elasticity of demand for dental services appears to be greater in the short run than in the long run. Analysis of HIE data indicated that price effects in the first year of coverage were twice as large as in the second year (Manning et al. 1985). Similar to other types of acute care, cost sharing tended to affect the decision to seek treatment much more than the expenditure once treatment was sought.

D. LONG-TERM CARE SERVICES

Together with longer life expectancy, the aging of the baby-boom generation is expected to greatly increase the demand for long-term care services. While research on the factors that affect the demand for long-term care is sparse, it suggests that the demand for these services is much more price sensitive than that for other types of health care.

Using 1989 National Long Term Care Survey data, Reschovsky (1998) estimated a price elasticity of –0.98 with respect to nursing home use among private payers. However, some consumers—those who lacked informal care resources from families and communities and those who had greater levels of disability—were much less price sensitive. Specifically, the price elasticity among those who were married was –2.40 (more than twice the average elasticity among all survey respondents), but it was –0.53 among those who were unmarried. However, most of Reschovsky's price elasticity estimates were not statistically significant at the conventional levels and therefore must be interpreted with caution.

A more recent study of price elasticity used 1991 cross-sectional data from for-profit nursing homes in the state of New York (Mukamel and Spector 2002). After imputing the marginal cost of care from facility-level data, this study concluded that the average elasticity with respect to changes in the marginal cost of care ranged from –3.46 to –3.85—implying that a 10 percent decrease in price would raise demand (for a given facility) by nearly 35 percent. Because they were derived as facility-specific elasticities, these estimates should be used with caution: they

are much larger than typically estimated elasticities of market-wide demand and may reflect alternative long-term care options that are unique to the observed time and sites of the study.

E. SUMMARY

Compared to the literature estimating the elasticity of demand for health insurance, relatively few recent studies have estimated the price elasticity of demand for insured health care services. In general, more recent studies have produced estimates that are broadly consistent with findings from the HIE: the demand for insured health services is price-inelastic, with most estimates centered at about –0.2 (Table IV.A). Price sensitivity varies for different types of services, but with a few exceptions, the differences are not large. In summary:

- Overall health spending may fall 2 percent in response to a 10 percent increase in the price of health care. The price-induced changes in demand are attributable more to changes in the probability of using any care than to changes in the amount of care used, once care has been accessed.
- Low-income consumers are more sensitive to price changes and, therefore, may be more likely to have adverse consequences from increased cost sharing.
- Recent studies on the demand for prescription drugs suggest that multi-tier formularies reduce drug expenditures, and that the demand for some drugs (e.g., those treating symptomatic conditions) may be more price-elastic than the demand for other drugs. Direct-to-consumer advertising may significantly reduce the price elasticity of demand for at least some prescription drugs.
- The demand for inpatient services may be less price-sensitive than the demand for outpatient services. Available evidence suggests that inpatient and outpatient care are complementary, not substitutes.
- The demand for mental health care, dental services, and long-term care services may be more price-elastic than the demand for other types of care. Because insurance coverage for these services is less than for other services, a significant increase in coverage is likely to have a greater effect on use than suggested by price elasticities that are estimated based on a change only in cost sharing for covered services.

TABLE IV.A

SUMMARY OF RECENT STUDIES ON THE PRICE ELASTICITY OF DEMAND
FOR HEALTH CARE SERVICES—OVERALL AND BY TYPES OF SERVICES

Study	Population	Demand Measure	Price Variation	Elasticity Estimate
		Overall Health Services		
Newhouse et al. (1993)	Participants in the Health Insurance Experiment (HIE)	Total medical expenditures	Coinsurance rates across plans	–0.17 to –0.22
Eichner (1998)	Employees in a one large employer	Total medical expenditures	Out-of-pocket costs	–0.62 to –0.75
Van Vliet (2004)	Middle- to upper-income individuals covered by one large insurance company in the Netherlands	Total medical expenditures	Deductibles[a]	–0.14
		Prescription Drugs		
Newhouse et al. (1993)	Participants in HIE	Expenditures for prescription drugs	Coinsurance rates across plans	–0.17
Smith (1993)	Enrollees in a national prescription drug card service	(1) Number of prescriptions (2) Total cost of prescriptions	Copayment rates	(1) –0.10 (2) not significant
Motheral and Fairman (2001)	Employees from multiple firms but enrolled in one PPO plan	(1) Number of prescriptions (2) Total cost of prescriptions	Copayment change resulting from moving from two-tier to three-tier plan	(1) –0.21 (2) –0.24
Joyce et al. (2002)	Employees from 25 large employers	Total cost of prescriptions	Copayment changes resulting from multi-tier formulas, doubling copayments in each tier, or mandatory generic substitution	–0.22 to –0.44
Goldman et al. (2004)	Employees from 30 employers with 52 health plans	Number of prescriptions in eight therapeutic classes	Doubling copayment rates	–0.25 to –0.45
Gibson et al. (2005)	Employees from multiple large firms	Number of prescriptions	Copayment rates	–0.04
Lansman et al. (2005)	Enrollees in four geographically diverse managed care plans	Number of prescriptions, by drug classes	Copayment changes resulting from moving from two-tier to three-tier plan	–0.10 to –0.60
Klick and Stratmann (forthcoming)	Medicare beneficiaries enrolled in Medigap	(1) Number of prescriptions (2) Total cost of prescriptions	Coinsurance rates across Medigap plans	(1) –1.01 (2) –0.69

TABLE IV.A (*continued*)

Study	Population	Demand Measure	Price Variation	Elasticity Estimate
		Acute Care		
Newhouse et al. (1993)	Participants in HIE	Expenditures for inpatient and outpatient care	Coinsurance rates across plans	Inpatient: –0.14 to –0.17 Outpatient: –0.17 to –0.31
Selby et al. (1996)	Enrollees in a large HMO plan in Northern California (Kaiser)	Number of emergency department visits	Copayment changes resulting from an introduction of $25 to $35 copay	14.6 percent decline
Simon et al. (1996)	Federal and state employees enrolled in a large HMO	Probability of any mental health service use	Copayment change resulting from an institution of $20 and subsequently $30 copay	–0.17 to –0.28
		Long-Term Care		
Reschovsky (1998)	Elderly persons with disabilities, Medicaid-eligible or private payers	Probability of using nursing home care	Imputed county-level monthly cost for private payers	–0.98 (not significant)
Mukamel and Spector (2002)	Private payers in for-profit nursing homes in the state of New York	Days residing in a particular nursing home facility	Marginal cost of care at the facility level	–3.46 to –3.85

[a] Once the deductible is satisfied there is little if any out-of-pocket payment for services.

V. INCOME ELASTICITY OF DEMAND FOR HEALTH INSURANCE AND SERVICES

In addition to price, personal income may affect decisions to purchase insurance coverage, choose among health plans, and use health care services. Unlike price, income is not generally viewed as a policy lever to alter the demand for health insurance or health care services.[19] As a result, the empirical research on income elasticity with regard to either health insurance or services is scant, and it is predominantly observational. Most studies simply compare demand among populations by income or poverty status.

A. HEALTH INSURANCE

Most early studies of income elasticity concluded that it was not significantly different from zero—that is, the demand for health insurance neither rises nor falls significantly with a change in personal or family income, all else being equal. In general, this result comports with a hypothesis of constant absolute risk aversion (Marquis and Long 1995).[20]

However, two (more recent) studies investigating price elasticity in the non-group market (where consumers face the full price of insurance and are unlikely to have unobservable alternative offers of coverage) found significant, though small income effects on the decision to purchase individual coverage among families without group coverage. Marquis and Long (1995)

[19] It is more feasible for policymakers to change eligibility for public programs than to change the incomes of target families, and expansions of Medicaid, SCHIP, and state-initiated coverage in the 1980s and 1990s provided excellent natural experiments for analysis. These expansions motivated a number of studies of the crowd-out effect of insurance coverage—reflecting the cross-price elasticity of demand for private insurance (reviewed in chapter III), when the cost of public coverage is reduced relative to private insurance options. Once covered by the public program, the price of health care to enrollees is reduced to nearly zero, affecting their demand for health care services (reviewed in chapter IV).

[20] Constant absolute risk aversion refers to a class of utility functions that assume as wealth increases, individuals hold the same dollar amount in risky assets. Hence, the demand for health insurance (which is designed to reduce the risk of a large, unforeseen medical expenditure) would not change significantly with income.

estimated income elasticities in the range of 0.01 to 0.15, and Marquis et al. (2004) estimated income elasticities of 0.03 to 0.04. In both studies, family income was measured relative to the federal poverty level.

Differences (or changes) in income may have a greater effect on consumers' in choosing among different health plans, as opposed to their demand for insurance overall. Barringer and Mitchell (1994) considered the effect of salary increases on choices between traditional FFS plans and the prepaid plans offered by a large employer. They found that a 10 percent increase in real salaries boosted demand for the traditional FFS plan by 1 to 2 percentage points, with nearly commensurate disenrollment from the prepaid plans. Studying the military health system (TRICARE, formerly known as CHAMPUS), Hosek et al. (1993) concluded that a 10 percent increase in household income decreased the probability that a family would enroll in the HMO option by 0.24 percentage points. (Ringel et al. (2002) translated this finding into an income elasticity of demand for enrollment in HMOs of –0.27.) However, because both studies were based on observational data, any number of unobserved factors correlated with both income and insurance demand (such as health status) could have biased their estimates in either direction.

B. HEALTH CARE SERVICES

Among consumers who have access to free care, changes in income would not affect their ability to obtain medical services. It follows that, among consumers with full insurance, the income elasticity would be very small, if not zero (Ringel et al. 2002). Evidence from the very few empirical studies of person-level data is consistent with this expectation. Based on results from the HIE, Phelps (1992) calculated income elasticities of 0.2 or less.[21] Reschovsky (1998)

[21] In contrast, Hosek et al. (1993) found that an increase in income among military families reduced the probability of both outpatient visits and inpatient visits, as well as the number of outpatient visits in the military system. This result was likely due to switching among higher-income beneficiaries to nonmilitary health services,

used the 1989 National Long Term Care Survey to examine demand for nursing home services among the elderly population. He found that income elasticity of demand for nursing home services among private-pay patients and patients eligible for Medicaid was not significantly different from zero.

At least two recent studies have attempted to estimate income elasticity by observing differences in average income and health care spending across states or nations, and over a longer time period (Dimatteo 2003, Freeman 2003). Both found that the income elasticity of demand for health care was greater at higher levels of aggregation (e.g., national versus individual expenditures), and also that the income elasticity of demand among consumers at low income levels is greater than at high income levels.

C. SUMMARY

The consensus of the limited literature estimating the income elasticity of demand for either health insurance or health services is that both are income-inelastic. However, because few studies actually observe an exogenous change in consumers' levels of income, nearly all studies that estimate income elasticity are based on observational data. These studies suggest that as income increases, the demand for health insurance and health services also increases, but the magnitude of the increase is relatively small: the estimates of income elasticity are consistently in the range of zero to 0.2 with respect to health care services, and zero to 0.1 with respect to health insurance. Some studies that have estimated income elasticity using time-series or aggregated state- or country-level data have produced higher estimates of income elasticity—but all in the range of 0.2 to 1.5.

(continued)
and illustrates the importance of recognizing unobserved alternatives when considering estimates of income elasticity.

VI. APPLICATION OF ELASTICITY ESTIMATES

Many researchers have applied elasticity estimates to draw conclusions about public policy with respect to either insurance coverage or health care costs. Reflecting long-standing concerns about health insurance coverage, most such applications have focused on the price elasticity of demand for health insurance.

This chapter highlights some of these applications and summarizes the general policy implications that researchers have drawn in four areas: tax subsidies for employer-sponsored coverage, tax subsidies for individual coverage, cost-sharing in Medicaid/SCHIP, and the general implications for health services use. While elasticity estimates also have been widely used to simulate or predict the outcomes of specific policy proposals, these applications are not discussed here, as their results are difficult to compare: even a small change in the elasticity parameters can produce substantial differences in simulated effects depending on the many assumptions and logic of the model.

A. TAX SUBSIDIES FOR EMPLOYER-SPONSORED COVERAGE

Federal and state tax subsidies are widely regarded as a critical to the development and maintenance of employer-sponsored health insurance. Conversely, the elimination of the tax exemption for employer-sponsored health insurance would likely be the largest single change that might increase price competition in the health insurance industry (Morrisey 2005). Many studies of tax-price elasticity have attempted to estimate the impact of tax subsidies and simulate the effects of eliminating them.

The greatest impact of tax subsidies for health insurance may be on employers' decisions to offer coverage and set eligibility rules (Gruber 2001). Gruber and Lettau (2004) simulated a major tax reform that would remove the tax subsidy (equivalent to a 58 percent increase in cost)

and found that it could lead to a substantial reduction in the offer of employer-provided coverage (by nearly 15.5 percent, equal to 24 million workers losing an offer of coverage). Their estimate of the impact on the level of total spending for insurance was even larger. Marton (2004) also found a large tax-price elasticity (-2.18) with respect to the quantity of insurance that employees demanded, measuring quantity as the premium for insurance policies selected in the 1987 National Medical Expenditure Survey. He concluded that a reduction in the tax subsidy might not cause employees to drop coverage, but instead cause them to select plans that offer less coverage. Presumably, therefore, the impact on service utilization and expenditures also would be smaller than others have estimated.[22, 23]

In contrast, Gruber and Washington (2005) found that employees' take up of coverage responded very little to differences in their tax price for coverage, but that tax subsidies did cause employees to choose more costly insurance plans. They concluded that this response would substantially raise the cost of increasing tax preferences in order to encourage greater take up. Marquis et al. (2004) and Blumberg et al. (2002) reached similar conclusions about the likely impact on greater tax subsidies on take up, although Blumberg et al. noted that tax subsidies might be more effective if more narrowly targeted to low-income workers. Consistent with that argument, Bernard and Selden (2003) concluded that low-income workers—as well as workers with low health risks and those in small firms—respond more strongly than the average worker to changes in the tax price of health insurance.

[22] However, many factors may affect the price elasticity of demand for health insurance. For example, Feldman et al. (1997) suggested that voluntary efforts to increase the extent of insurance offered by small business could be successful, provided that low-priced policies are available with few restrictions and that the products are widely publicized and permanent. This conclusion supposes a much larger price elasticity of offer (especially for small firms) than other studies have found.

[23] Regulatory efforts to promote access in the small-group market have done little to increase rates of insurance coverage. Monheit and Vistnes (1999) attributed this to the emphasis on altering insurer behavior instead of creating incentives to raise the value of health insurance for targeted firms and employees.

B. TAX SUBSIDIES FOR INDIVIDUAL COVERAGE

Tax subsidies for individual insurance coverage also may have relatively little impact on decisions to buy coverage. Marquis and Long (1995) estimated that a subsidy of 60 percent would induce only about one-quarter to one-third of uninsured working families to purchase non-group insurance. Marquis et al. (2004), Reschovsky and Hadley (2004), and the CBO (2005) reached similar conclusions.

Reschovsky and Hadley (2004) further compared out-of-pocket spending for health care among low/middle-income uninsured people with their net spending on insurance and health care combined, if they were to accept any of three hypothetical tax credits. Because of the high cost and low benefits of nongroup policies, they found that nearly all would need to spend more out-of-pocket for health care under the hypothetical tax credits than they spent when uninsured—and often much more. These results suggested that a sizable reduction in the number of uninsured would require a more generous tax credit than those in current proposals.

Finally, Swartz (2001) has pointed out that unaffordable premiums are not all that prevent uninsured people from buying insurance. A significant number of people may be deemed to be high-risk and therefore denied individual coverage, offered a ”substandard” policy with major benefits excluded, and/or charged much higher premiums. Consequently, subsidies based on income alone would not help many people gain coverage unless insurer underwriting in the individual market also is constrained.

C. COST SHARING IN MEDICAID/SCHIP

Facing budget crises as well as a potential cut in federal matching, many states are considering whether to raise cost-sharing or limit covered benefits for some or all participants in their Medicaid and SCHIP programs. While no rigorous empirical estimation of price elasticity in Medicaid/SCHIP has been done, Ku and Wachino (2005) concluded that all available research

evidence points to a very high level of price sensitivity among Medicaid beneficiaries. It follows that imposing or increasing premiums and cost sharing in Medicaid or SCHIP could jeopardize beneficiaries' ability to afford health services, compromise their health, and ultimately lead to higher program costs due to greater use of emergency rooms and other types of care.

D. POLICY IMPLICATIONS RELATED TO HEALTH SERVICE USE

The literature includes fewer simulations that use elasticity estimates of demand for health care services than those that use insurance elasticity estimates. Most of the policy implications drawn from this literature relate to the implementation of multi-tier copayment structures for prescription drugs.

Joyce et al. (2002) concluded that several different approaches to increase cost-sharing among working-age enrollees with employer-provided drug coverage—adding an additional level of copayment, increasing existing copayments, or requiring mandatory generic substitution—would each reduce plan payments and overall drug spending by increasing enrollees' share of expenses. However, Harris et al. (1990) concluded that the effect of copayments on reducing costs was relatively small, although the volume of prescriptions would fall. In light of the relatively high price elasticity of demand for medications, Goldman et al. (2004) raised concerns about adverse health consequences that might result from significant increase in copayments, particularly for patients with chronic illness (in this case, diabetes).

VII. METHODOLOGICAL CHALLENGES

Estimating the elasticity of demand for health insurance and health care is not a simple task. Given the variety of factors involved in consumers' decision-making process and the complexity of the health care market, isolating the change in demand that can be attributed only to a change in price or income is exceedingly difficult. This chapter highlights four common methodological challenges in estimating the price or income elasticity of demand for health insurance or health care services: unobserved price, endogeneity, omitted variables, and provider-induced demand. We describe the impact of each problem on estimates of price elasticity and summarize the approaches that researchers have taken to address them.

A. UNOBSERVED PRICE

Studies that examine the own-price elasticity of demand must consider not only the price of insurance or care that is purchased, but also the price when it is not purchased. However, surveys typically do not ask respondents (employers or employees) about the price they were offered, if they ultimately did not buy coverage or care. For the purpose of estimating price elasticity, the problem with such data is that observed prices are not random. For example, firms that offer coverage to their employees may systematically have been offered lower premiums. If so, data from firms that offer coverage cannot be used to accurately predict premiums for firms that do not.

A simple approach to address this problem, often used in early studies, is to include in the model both types of firms (with observed and unobserved prices) and estimate a Tobit model that adjusts for the left-censored observations. However, the key assumption of a Tobit model is that the same factors affect both the decision to offer coverage and the price of that coverage. Some researchers have challenged this assumption and advocate use of a sequential decision model

instead—that is, a model that first estimates whether firms will offer coverage at all, and then how much they offer (measured as the price of coverage). As a result, many researchers now use a Heckman two-stage procedure (first estimating the probability of firms offering coverage and then the price) to impute the unobserved price offered to those who decline coverage (Feldman et al. 1997, Hadley and Reschovsky 2002). However, the selection of explanatory variables to include in the imputation of unobserved price is critical (see the discussion of omitted variables below). Moreover, based on observation of premiums for both takers and decliners, Blumberg et al. (2001) demonstrated that using imputed versus actual offered premiums for group coverage resulted in larger elasticity estimates with respect to employees' take up of coverage.

B. ENDOGENEITY

To obtain unbiased estimates of price or income elasticity, both price and income must be uncorrelated with any variable that affects the purchase decision but for which the model does not control. To the extent that there are no such omitted variables, then price or income are exogenous to the estimation, and estimates of elasticity are unbiased.

The HIE is still considered to be the most reliable source of estimates for the price elasticity of demand for insured services, because it largely (but not entirely) avoided adverse selection (and, therefore, the problem of endogeneity) by randomly assigning families to health insurance plans. Individuals with unobserved high health care needs did not have the opportunity to systematically select greater coverage that would bias their sensitivity to a change in the price of health care services.

In contrast, studies that have used a natural experimental design usually face little risk of endogeneity. This risk may be mitigated, if elasticity estimates can be estimated using panel data—that is, data on experience over a period of time for both the "treatment" group and the "control" group. With panel data, researchers can use a difference-in-difference method to

compare pre- and post-treatment periods (where the "treatment" is a change in price) and control for any time trend as well as any permanent average difference between the treatment and control group (e.g., whether a firm offers coverage at all). Difference-in-difference estimation assumes that a parallel trend would have occurred for the treatment and control groups in the absence of the treatment, all else being equal. It yields a biased estimate of demand elasticity if this assumption fails.

Observational studies—those that rely on secondary data from household or employer surveys—typically suffer most from endogeneity. Most observational studies capture price variation based on existing differences in plans or coverage, making it very difficult to establish how price changes may have affected demand. Researchers have developed complex statistical models to deal with endogeneity, many relying on instrumental variables. An instrumental variable must be correlated with the endogeneous variable itself (in this case, price), but uncorrelated with the outcome variable (i.e., demand), except through the endogeneous variable. A variable that would meet both criteria is extremely hard to find.

C. OMITTED VARIABLES

Many statistical models, using a variety of data sources, have been developed to control for factors other than price or income in estimating demand elasticity. Nevertheless, the likelihood that an estimation model would miss some determinants of demand—and that the resulting elasticity estimate is biased—is very high. However, the number of potential omitted variables probably has declined, as data and information about health insurance and health care markets have improved. Many variables that were unavailable in earlier studies now are often available and widely used—for example, individual health status, plan benefit design, and whether coverage is obtained through a spouse or other source.

Despite more complete specification of econometric models, the range of data sources (each with its own advantages and problems) still contributes to differences in estimates of elasticity. The most common source of data used to estimate elasticity is the CPS. Conducted by the Census Bureau, this survey offers multiple years of data (allowing the researcher to control for many changes over time) and a large number of observations in each year. However, it is not a panel survey: most of the population sample changes from year to year.[24] Furthermore, the CPS offers information only about whether household members are covered, not information about the cost or design of their coverage.

The Medical Expenditure Panel Survey (MEPS) conducted by AHRQ does provide panel data, although it relies on a much smaller sample than CPS. MEPS includes information about employees' insurance options and coverage (such as premiums and coinsurance rates), as well as personal information (such as income and assets, health status, and health care utilization and expenditures).[25]

Many researchers have tried to link CPS across years or statistically match CPS to MEPS to cobble together a dataset adequate to their research needs—to estimate the elasticity of demand for health insurance and health care services reliably and on an ongoing basis. To directly address this need would require a conducting a national panel survey like MEPS, but for a larger sample of the population and released on a faster schedule. The importance of state-level regulation and geographic differences in medical practice would suggest that both the design and size of the sample must be sufficient to support at least periodic estimates at the state level.

[24] The CPS uses a rotational sample design. The overlapping sample in the March sample is one-third of the full sample. However, it is not intended (nor is it weighted) to be used as a panel.

[25] Many early studies of elasticity relied on the predecessor surveys to MEPS: the National Medical Expenditure Survey (NMES) and the National Medical Care Utilization and Expenditure Survey (NMCUES).

D. SUPPLY-SIDE-INDUCED DEMAND

Health care providers are both suppliers of the health services and agents for their patients. How consumers respond to price change with respect to health services strongly depends on how their physicians advise them about medical treatment. This advice may vary by physician, reflecting differences in physicians' understanding of or preferences about medical procedures as well as their financial incentives. It may not reflect either full understanding of the cost implications for the patient or the patient's own preferences related to cost.

In the insurance market, insurers are arguably more likely to respond to a change in demand by altering their product designs and marketing strategies than by simply changing prices for the same products. As a result, premiums may decline in response to reduced demand, but the value of coverage may also decline—potentially driving a further reduction in the demand for coverage.

Research information about either provider-induced demand or supply-side behavioral changes in response to a price change is very limited. A few studies have attempted to investigate long-run elasticity (in relation to a short-term estimate), but none have considered supply-side factors in their models.

VIII. GAPS IN THE LITERATURE

Since the HIE, an extensive literature has emerged using more recent data and improved statistical techniques to estimate the price and income elasticity of demand for health insurance and health care services. As a result, we know much more about consumers' response to changes in the price of health insurance and certain health care services than we did 30 years ago, especially with respect to differences in the demand for coverage among employers, employees, and individuals. Yet, gaps exist in every aspect of estimating and applying elasticity—whether related to data or methodological limitations, knowledge about certain products or subpopulations, or applications for policy simulation. This chapter summarizes the major gaps identified in our review of the literature. Filling any or all of these gaps could offer great value to policymakers both by improving the science of elasticity estimation and by supporting better policy analysis and evaluation.

A. DATA AND METHODS

As discussed in the previous chapters, a number of methodological challenges have made elasticity estimation difficult. Although researchers have developed sophisticated econometric techniques to address some of these challenges, more could be done in three fundamental areas to improve the precision of elasticity estimates.

1. Expand Current Surveys to Accommodate Linking Data

Assembling data that contain full price and income information as well as an accurate and complete set of other factors that affect demand is a fundamental condition for improving estimates of the elasticity of demand for either health insurance or health care services. Currently, no single data source obtains information for all of the parties to decisions about health insurance or health care use: individuals and their families, employers, providers, and

health plans. Lacking such comprehensive data, researchers have sometimes linked data from multiple sources to assemble the information they need for modeling (e.g., simulating workforce characteristics in order to understand employer offer behaviors observed in employer surveys). Because each data source typically has a different sample design as well as differences in variable definitions and other features, linking them is a challenging task in itself, requiring advanced statistical techniques. Even so, the error introduced by linking data that are not designed for this purpose may be substantial. Some expansion of current surveys, carefully considering both the sample design and the definition of variables with a view toward linking the data for modeling purposes, could substantially help to improve elasticity estimates.

2. Consideration of Available Options

Many recent studies have failed to model the options available to individuals in their decisions to purchase health insurance or health care services, although the availability of alternatives can significantly alter demand.[26] In addition, we know little about the relative demand for health insurance and money wages. Even studies of plan choice often compare plans with similar benefit designs and premiums, offering little insight about how consumers might choose when confronted with very different benefit designs and a large difference in price. Efforts to address such issues in data and analysis—for example, obtaining information about eligibility and premiums for coverage from a spouse's plan when not taken—could greatly improve price elasticity estimates.

[26] For example, Honig (2005) found that potential coverage by spouses plays a large role in the decisions of both husbands and wives regarding take-up of their own coverage.

3. Consideration of Supply-Side Behaviors

Little is known about how insurers or providers might respond to a large change in the price for coverage or services, such as might occur if a sizeable refundable tax credit for health insurance were enacted. In such an event, it is reasonable to expect that insurers might change the nature of insurance products in an attempt to offer "zero premium" plans (net of the refundable credit) and that providers might alter the cost of seeking care (to attract newly insured patients or avoid bad debt that may be associated with underinsured patients). Either response would alter demand.

While including such supply-side behaviors in a structural model can raise methodological challenges, understanding supply-side behaviors is essential to anticipating the long-term effects of policy change. At minimum, researchers should consider possible scenarios of supply-side changes and conduct sensitivity analyses of demand changes in response to these scenarios. However, at present, there is virtually no basis for selecting among or quantifying possible scenarios. Even a modest program of research on supply-side responses could be very helpful in guiding how researchers might consider supply-side effects when modeling policy change.

B. SPECIFIC INSURANCE PRODUCTS, SERVICES, AND SUBPOPULATIONS

Both supply and demand in the health care market are heterogeneous: not only are products tailored to address different needs, but the population varies widely with respect to attributes that affect decision-making about health insurance coverage and service use. To be efficient, public policy initiatives to expand coverage probably will be targeted narrowly to specific subpopulations. Consequently, for public policy to be effective, it is necessary to anticipate how target subpopulations will respond. Our assessment of the literature suggests there are a number of products, services, and subpopulations that may be important targets for public policy but have not been studied at all or studied adequately.

1. Consumer-Directed Health Plans (CDHPs)

CDHPs raise enrollees' financial stake in making informed choices about the cost of their care. However, the demand for these plans is largely unevaluated, except in the context of employee choice among similar alternatives. In addition, it is unclear how tax-favored programs such as flexible spending accounts or health savings accounts (HSAs) might affect the demand for these plans: a relatively small share of the population with private insurance has a high-deductible health plan that would qualify for an HSA, and only a minority of these plans actually include an HSA (Claxton et al. 2005). Nevertheless, the consumer directed health plans has attracted attention from policymakers as a potential model for significantly expanding coverage while controlling cost. A better understanding of the factors that influence demand for CDHPs—as well as the use of health care services once enrolled—is essential to understanding their potential to provide adequate and affordable coverage more broadly.

2. Medicare Services

With Medicare's beneficiary population growing faster than the tax-base that supports the program, Medicare's long-term financing presents an immense challenge. In an effort to address this challenge, Medicare's benefit design may change significantly in the long-term and also in the short-term, as Medicare Advantage plans adjust benefits to constrain cost. However, the research literature offers very limited basis for anticipating the effects of changes in Medicare's benefit design, including the introduction of Part D. Even the few studies that have been conducted were based on "synthetic" data (derived from linking beneficiary survey data to potential employer, Medigap, or Medicare+Choice benefit designs). Consumers' price responsiveness with respect to the stand-alone prescription drug plans, especially—entirely new products in the market—may differ substantially from previous estimates.

3. Medicaid, SCHIP, and Other State Health Care Programs

Available evidence suggests that enrollees in health programs for low-income beneficiaries (Medicaid, SCHIP, and other state health care programs) can be deterred by very small increases in premiums or cost sharing. Indeed, some states have increased premiums and copayments, and others are considering doing the same. Nevertheless, there is meager research for anticipating how these changes may affect beneficiaries' decisions to enroll, their use of health services, and their health outcomes.

4. Low- and Lower Middle-Income Populations

Many proposals would target assistance to the population whose income is very modest relative to the average cost of health insurance or health care services, but who are not currently eligible for public programs. However, designing and evaluating these proposals requires better information about the price elasticity of demand for insurance among low-income populations, in order to understand who and how many would participate and how much such assistance would cost if it were to be effective. Available research evidence clearly indicates that low-income people are more price-sensitive than the average across the entire population. However, estimates of price elasticity specifically calculated for the low-income population and the population from 200 to 400 percent FPL are not generally available.

5. Mental Health, Dental and Long-Term Care Services

Very few studies have attempted to update or refine the HIE elasticity estimates with respect to some types of health care services—in particular, the very services for which consumers historically have had relatively little insurance coverage: mental health care, dental care, and long-term care services.

Improvements in coverage for these services (e.g., in response to state mental health parity legislation) have offered some natural experiments demonstrating how consumers respond to

changes in price. However, for the purpose of designing federal and state policy to improve access to these services and still manage cost, it is essential to understand more clearly how consumers might respond to differences in coverage. Studies to address this gap would require the analysis of claims data (for each service type) to compare the use of care, and detailed knowledge about the differences in insurance benefit designs for a common scope of coverage.

C. APPLICATION OF DEMAND ELASTICITIES

How researchers incorporate demand elasticities in modeling policy change can dramatically affect their results. The application of elasticities derived from the literature may inadvertently introduce error in estimates of policy effects or infer a degree of certainty that may be misleading. Two specific changes, in research reporting and modeling conventions respectively, could help to reduce the confusion that often results from these problems:

1. Clear Reporting of Definitions

The price and income elasticities estimated in the literature may be defined very differently (see Chapter II), and researchers often do not offer adequate documentation of the definitions they have used. As a result, alternative elasticities taken from the literature can mean very different things and have very different policy implications, but users are unaware of the differences or how to compare them. Clear and full documentation of the precise formulas used to calculate elasticities should be a universal standard in the published literature.

2. Conventions for Conducting Sensitivity Analyses

Because every elasticity reported in the literature is based on estimation, they all involve error. By convention, error in an estimate is measured as a confidence interval, which indicates the magnitude of uncertainty around the estimate and provides the upper and lower bounds of plausible estimates from the same analysis. Policy simulations based on this range will be more

informative than those based on a point estimate. As a convention, such simulations should include sensitivity analysis at the upper and lower bounds of the confidence interval.

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APPENDIX A

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APPENDIX B

FORMULAS FOR CALCULATING ELASTICITY

Elasticity Measure	Definition	Formula
Point Elasticity	Elasticity calculated at a particular point on a demand curve. Defined as the percent change in quantity resulting from a one percent change in price. Point elasticity is not reversible, i.e. it changes depending on which point is considered the starting point. In addition, if any of the starting parameter equals zero, point elasticity cannot be calculated.	$[(Q_1-Q_0)/Q_0]/[(P_1-P_0)/P_0]$
Arc Elasticity	Elasticity calculated over a certain arc or section of the demand curve. Defined as the ratio of "change in quantity divided by average quantity" and "change in price divided by average price." Unlike point elasticity, arc elasticity is reversible, and can be calculated when any of the parameters equals zero. For these reasons, arc elasticity is often calculated instead of point elasticity.	$\{(Q_1-Q_0)/[(Q_1+Q_0)/2]\}/\{(P_1-P_0)/[(P_1+P_0)/2]\}$
Semi-Elasticity	Elasticity that compares a percent change in one variable to a level change in the other. A level change could be a dollar increase in price, or a percentage point increase in the proportion insured. Semi-elasticity is often used in policy simulations.	$[(Q_1-Q_0)/Q_0]/(P_1-P_0)$ or $(Q_1-Q_0)/[(P_1-P_0)/P_0]$
Take-Up Elasticity	Elasticity that calculates the percent of the remaining uninsured that would take up coverage for a given price decrease. Instead of using the coverage rate (Q in the above formulas), take-up elasticity uses the uninsured rate, or the number of uninsured (U in this formula) to measure the outcome change. Take-up elasticity is often used to compare policy proposals designed to reduce the number of uninsured.	$[(U_1-U_0)/U_0]/[(P_1-P_0)/P_0]$